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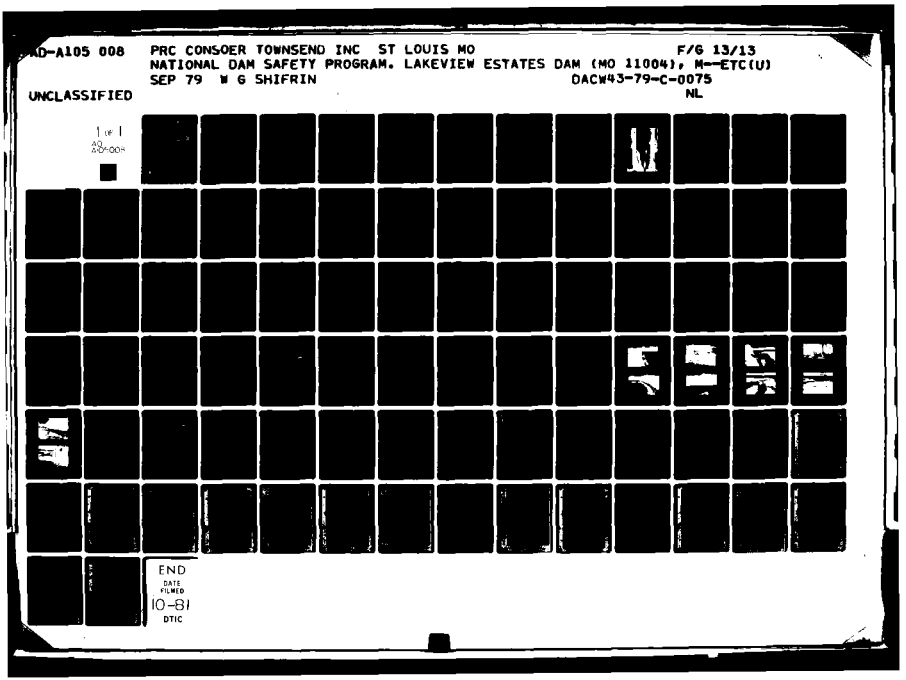

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LAKEVIEW ESTATES DAM
WARREN COUNTY, MISSOURI
MO 11004

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

United States Army
Corps of Engineers
Serving the Army
Serving the Nation

St. Louis District

PREPARED BY: U. S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

SEPTEMBER, 1979

UNCLASSIFIED

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4. TITLE (and Subtitle) Phase I Dam Inspection Report National Dam Safety Program Lakeview Estates Dam (MO 11004) Warren County, Missouri	5. TYPE OF REPORT & PERIOD COVERED (9) Final Report 6. PERFORMING ORG. REPORT NUMBER
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18. SUPPLEMENTARY NOTES

(6) National Dam Safety Program. Lakeview Estates Dam (MO 11004), Mississippi-Kaskaskia-St. Louis Basin, Warren County, Missouri. Phase I Inspection Report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety, Lake, Dam Inspection, Private Dams

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.

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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

SUBJECT: Lakeview Estates Dam (Mo. 11004) Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Lakeview Estates Dam (Mo. 11004).

It was prepared under the National Program of Inspection of Non-Federal Dams.

This dam has been classified as unsafe, non-emergency by the St. Louis District as a result of the application of the following criteria:

1) Spillway will not pass 50 percent of the Probable Maximum Flood
2) Overtopping could result in dam failure
3) Dam failure significantly increases the hazard to loss of life downstream

SUBMITTED BY: SIGNED
Chief, Engineering Division — 24 SEP 1979 Date

APPROVED BY: SIGNED
Colonel, CE, District Engineer — 24 SEP 1979 Date

LAKEVIEW ESTATES DAM
WARREN COUNTY, MISSOURI

MISSOURI INVENTORY NO. 11004

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY
CONSOER, TOWNSEND AND ASSOCIATES LTD.
ST. LOUIS, MISSOURI
AND
ENGINEERING CONSULTANTS, INC.
ENGLEWOOD, COLORADO
A JOINT VENTURE

UNDER DIRECTION OF
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
FOR
GOVERNOR OF MISSOURI

SEPTEMBER 1979

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Lakeview Estates Dam, Missouri Inv. No. 11004
State Located: Missouri
County Located: Warren
Stream: An unnamed tributary of Big Creek
Date of Inspection: May 17, 1979

Assessment of General Condition

Lakeview Estates Dam was inspected by the engineering firms of Consoer, Townsend and Associates LTD., and Engineering Consultants, Inc. (A Joint Venture) of St. Louis, Missouri using the "Recommended Guidelines for Safety Inspection of Dams". These guidelines were developed by the Chief of Engineers, U.S. Army, Washington, D.C., with the help of Federal and State agencies, professional engineering organizations, and private engineers. The resulting guidelines are considered to represent a consensus of the engineering profession.

Based on the criteria in the guidelines, the dam is in the high hazard potential classification, which means that loss of life and appreciable property loss could occur in the event of failure of the dam. Within the estimated damage zone of two miles are four houses, one gravel road crossing, one railroad crossing, one trailer park, and a crossing of Interstate Highway No. 70 which

may be subjected to flooding, with possible damage and/or destruction, and possible loss of life. Lakeview Estates Dam is in the small size classification since it is less than 40 feet high and impounds less than 1,000 acre-feet of water.

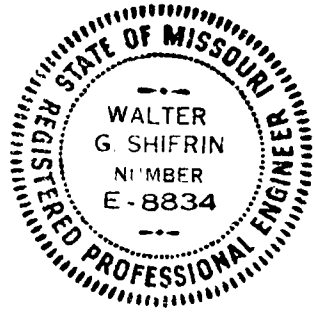
Our inspection and evaluation indicates that the spillway of Lakeview Estates Dam does not meet the criteria set forth in the guidelines for a dam having the above size and hazard potential. Lakeview Estates Dam being a small size dam, with a high hazard potential, is required by the guidelines to pass from one-half of the Probable Maximum Flood to the Probable Maximum Flood without overtopping. Since there is significant hazard potential downstream of the dam, the appropriate spillway design flood for this dam is the Probable Maximum Flood. It was determined that the reservoir/spillway system can accomodate 17 percent of the Probable Maximum Flood without overtopping the dam. Our evaluation indicates that the reservoir/spillway system will accomodate the 10-year flood without overtopping; however, the dam will be overtopped during the occurrence of the 100-year flood.

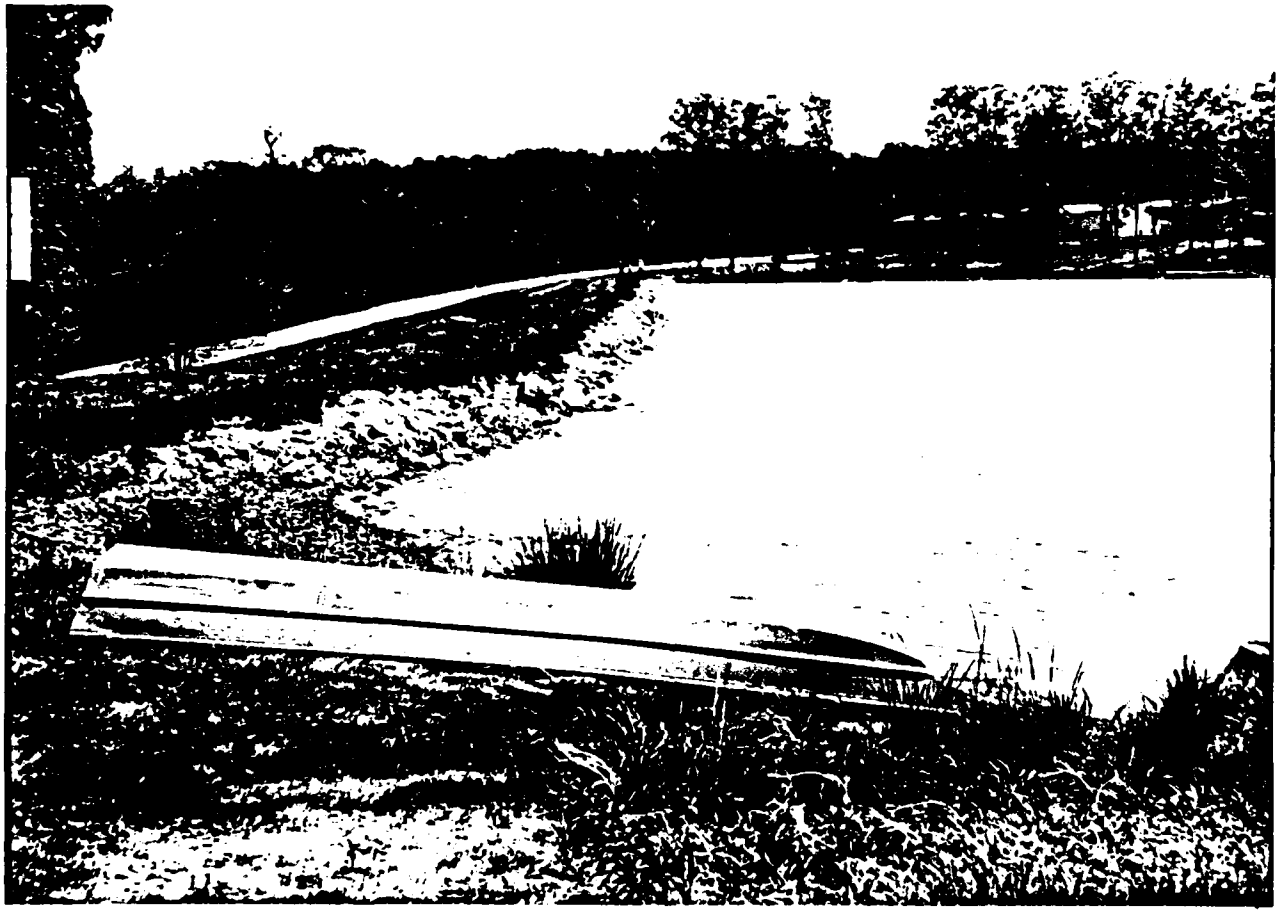
The Probable Maximum Flood is defined as the flood discharge that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the region. The 10- and 100-year floods are defined as floods having ten percent and one percent chance, respectively, of being equalled or exceeded during any given year.

Other deficiencies noted by the inspection team were rodent activity on the embankment, a need for periodic inspection by a qualified engineer and a lack of maintenance schedule. The lack of stability and seepage analyses on record is also a deficiency that should be corrected.

It is recommended that the owner take action to correct or control the deficiencies described above.

Walter G. Shifrin, P.E.





Overview of Lakeview Estates Dam

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

LAKEVIEW ESTATES DAM, I.D. No. 11006

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

LAKEVIEW ESTATES DAM, Missouri Inv. No. 11004

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

The Dam Inspection Act, Public Law 92-367 of August, 1972, authorizes the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspections. Inspection for Lakeview Estates Dam was carried out under Contract DACW 43-79-C-0075 to the Department of the Army, St. Louis District, Corps of Engineers, by the engineering firms of Consoer, Townsend & Associates Ltd., and Engineering Consultants, Inc. (A Joint Venture), of St. Louis, Missouri.

b. Purpose of Inspection

The visual inspection of Lakeview Estates Dam was made on May 17, 1979. The purpose of the inspection was to make a general assessment as to the structural integrity and operational adequacy of the dam embankment and its appurtenant structures.

c. Scope of Report

This report summarizes available pertinent data relating to the project; presents a summary of visual observations made during the field inspection; presents an assessment of hydrologic and hydraulic conditions at the site; presents an assessment as to the structural adequacy of the various project features; and assesses the general condition of the *dam with respect to safety*.

Subsurface investigations, laboratory testing, and detailed analyses were not within the scope of this study. The conclusions drawn herein, therefore, are based on the presence of, or absence of, obvious signs of distress. No warranty as to the absolute safety of the project features is implied by the conclusions presented in this report.

It should be noted that reference in this report to left or right abutments is as viewed looking downstream. Where left abutment or left side of the dam is used in this report, this also refers to west abutment or side, and right to the east abutment or side.

d. Evaluation Criteria

Criteria used to evaluate the dam were furnished by the Department of the Army, Office of the Chief of Engineers, in "Recommended Guidelines for Safety Inspection of Dams", Appendix D. These guidelines were developed with the help of several Federal agencies and many state agencies, professional engineering organizations, and private engineers.

1.2 Description of the Project

a. Description of Dam and Appurtenances

It should be noted that design drawings are not available for the dam or appurtenant structures. The following description is based on visual observations and information taken from Fenneman, N.M.,"Physiographic of Eastern United States", 1946.

The dam embankment is a compacted earthfill structure. The crest width is approximately 17 feet, and the length is 610 feet. The crest elevation is approximately 853.0 feet above MSL, and the maximum height of the embankment was measured to be 25 feet.

The downstream slope of the embankment was measured as 1V to 3H. The upstream slope could not be measured because of high reservoir level, scalloping near the crest and a berm just under the water surface. Limestone riprap in sizes from sand to boulder was dumped along the upstream slope close to the crest. The entire exposed embankment has a grass cover.

The damsite is situated on the border between the Dissected Till Plain Section of Central Lowlands Physiographic Province which extends to the north and the Ozark Plateau Province to the south. Although the area in which the dam and reservoir are located was glaciated during Pleistocene time, the till and loess which characterize the uplands of the Till Plains have been largely removed by erosion since the end of the Pleistocene. The area is characterized by wooded hills which have gentle to steep slopes.

The bedrock geology of the area, as shown on the Geologic Map of Missouri (1979), typically consists of gently northeastwardly dipping (ca. 30-50 feet/mile) sediments of Paleozoic age. To the north of Warren County these beds are often capped by young (Pleistocene) deposits of glacial drift and wind blown loess. In southern areas of the county the bedrock is generally covered by residual soil, colluvium, or alluvium. The rocks underlying the area are predominately carbonates (limestones and dolomites), although beds of sandstone and shale are not infrequent.

The bedrock of Warren County contains some minor folding. The largest known geologic structure in the area is a gentle anticline centered about 2 1/2 miles northwesterly of the town of Warrenton. This fold does not appear to affect the beds at the damsite.

The Soil Conservation Service (Soil Survey of Montgomery and Warren Counties, Missouri 1978) reports that soils of the bottom lands at the site consist of silty clays (CL-ML, CL) of the Dockery series. The upslope soils consist of clay (CL, CH), silty clay (CL-ML) and sandy clay (SC) of the Keswick series and Hatton series.

Two spillways are located at Lakeview Estates Dam. A service spillway is located within the embankment fill near the right abutment of the dam. This spillway is a non-reinforced concrete channel with a 5 foot bottom width, side slopes of 1V to 1.25H, and an elevation difference from the spillway crest to the embankment crest of 2 feet. Downstream of the concrete channel a 24-inch diameter corrugated metal pipe collects and transports flow under a paved roadway. This corrugated metal pipe extends through the embankment fill and discharges spillway flows onto a concrete pad and into the downstream channel.

The emergency spillway is an open channel depression located just beyond the left abutment of the dam. This spillway is a grass-lined channel with a 17 foot long concrete weir embedded in the channel. The channel has a bottom width of 17 feet, side slopes of about 1V to 12H, and an elevation difference from the weir crest to the embankment crest of 1 foot, 7 inches.

There is no operating outlet pipe or low level drain at the dam.

b. Location

Lakeview Estates Dam is located near the head of a small intermittant stream that flows northeasterly then easterly for about three quarters of a mile before entering Big Creek. Big Creek is intermittant at this point but becomes perennial one half mile downstream to the crossing of Interstate Highway 70. Big Creek flows north-northeastward about six miles, then swings eastward for about 14 miles where it enters the Cuivre River. The Cuivre, about 13 miles below its confluence with Big Creek, enters the Mississippi about 3 miles east of the town of Old Monroe.

The main access from Warrenton, Missouri is west on the Interstate Highway No. 70 frontage road approximately 1 1/2 miles to a small gravel road, thence south on this road approximately 300 feet to a turnoff to Lakeview Estates. The dam and lake is part of the Lakeview Estate development. The damsite is shown on the Warrenton Quadrangle Sheet (7.5 mintue series) in Section 30, Township 47 North, Range 2 West.

c. Size Classification

According to the "Recommended Guidelines for Safety Inspection of Dams", by the U.S. Department of the Army, Office of the Chief Engineer, the dam is classified in the dam size category as being "Small" since its storage is less than 1,000 acre-feet. The dam is also classified as "Small" in dam height category because its height is less than 40 feet. The overall size classification is, accordingly, "Small" in size.

d. Hazard Classification

The dam has been classified as having "High" hazard potential in the National Inventory of Dams, on the basis that in the event of failure of the dam or its appurtenances, excessive damage could occur to downstream property, together with the possibility of the loss of life. Our findings concur with the classification. Within the estimated two mile damage zone downstream of the dam are four houses, one gravel road crossing, one railroad crossing, one trailer park, and a crossing of Interstate Highway No. 70.

e. Ownership

The dam is owned by Mid Central Development Company. The mailing address is Mid Central Development Company, c/o Mike Pitla, #1 Oaktree Court, Lakeview Estates, Warrenton, Missouri, 63383.

f. Purpose of Dam

The purpose of the dam is to impound water for recreational use as a private lake. The lake is utilized by the inhabitants of the adjacent Lakeview Estates Development.

g. Design and Construction History

Lakeview Estates Dam was built by Mr. Russell Bollinger (deceased) of Wright City, Missouri. It is believed that Mr. Bollinger had no formal design for the dam. No records are available concerning the construction of the dam.

h. Normal Operational Procedures

There are no set operational procedures for Lakeview Estates Lake and the water level is controlled by rainfall, runoff, evaporation and the elevation of the spillway located at the right abutment. The lake is used soley for recreational purposes and reportedly stays full all year due to several springs which feed into the lake. This information was obtained verbally from the owner, Mr. Mike Pitla of Mid Central Development Co.

1.3 Pertinent Data*

a. Drainage Area (square miles):	0.25
b. Discharge at Damsite	
Estimated experienced maximum flood (cfs):	NA
Estimated ungated spillway capacity at maximum pool elevation (cfs):	190
c. Elevation (Feet above MSL)	
Top of dam:	853.0
Spillway crest:	
Service Spillway	851.0
Emergency Spillway	851.42
Normal Pool	851.0
Maximum Pool(PMF):	854.05
d. Reservoir	
Length of maximum pool: (Feet)	2000
e. Storage (Acre-Feet)	
Top of dam:	223
Spillway crest:	
Service Spillway	192
Emergency Spillway	202
Normal Pool:	192
Maximum Pool (PMF):	257
f. Reservoir Surface (Acres)	
Top of dam:	27.5
Spillway crest:	
Service Spillway	25.0
Emergency Spillway	25.5

Normal Pool:	25.0
Maximum Pool: (PMF)	27.5

g. Dam

Type:	Rolled Earthfill
Length:	610 feet
Structural Height:	35.0 feet
Hydraulic Height:	35.0 feet
Top width:	17.0 feet (average)
Side slopes:	
Downstream	1V to 3H
Upstream	Unknown
Zoning:	Unknown
Impervious core:	Unknown
Cutoff:	Unknown
Grout curtain:	Unknown

h. Diversion and Regulating Tunnel — None

i. Spillway

Type:	
Service Spillway	Uncontrolled, concrete channel
Emergency Spillway	Uncontrolled, earth channel
Length of weir:	
Service Spillway	5 feet
Emergency Spillway	17 feet
Crest Elevation (feet above MSL):	
Service Spillway	851.0
Emergency Spillway	851.42

j.	Regulating Outlets	None

* The term "Maximum Pool" used in this section indicates pool at top of dam elevation and the term "Maxiumum Pool (PMF)" indicates highest pool level during the occurrence of PMF, assuming an intact dam.

SECTION 2 : ENGINEERING DATA

2.1 Design

No design data is available for this dam. The only information concerning design has been obtained through conversations with people who knew the contractor, Mr. Bollinger (deceased).

2.2 Construction

No construction related data is available for this report, other than that listed in the construction history of Section 1.2g.

2.3 Operation

No operational data is available for this study.

2.4 Evaluation

a. Availability

No design drawings, design computations, construction data, or operation data is available.

In addition, no pertinent data was available for review of hydrology, spillway capacity, flood routing through the reservoir, outlet capacity, slope stability, seepage analysis, or foundation conditions.

b. Adequacy

The lack of engineering data did not allow for a definitive review and evaluation. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing and evaluating design, operation and construction data, but is based primarily on visual inspection, past performance history, and sound engineering judgment.

Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were also not available, which is considered a deficiency. These seepage and stability analyses should be performed for appropriate loading conditions (including earthquake loads) and made a matter of record.

c. Validity

No valid engineering data are available.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

A visual inspection of the Lakeview Estates Dam was made on May 17, 1979. The following persons were present during the inspection:

Name	Affiliation	Disciplines
Dr. M.A. Samad	Engineering Consultants, Inc.	Project Engineer, Hydraulics and Hydrology
Jon Diebel	Engineering Consultants, Inc.	Structural and Mechanical
Peter Strauss	Engineering Consultants, Inc.	Soils
Peter Howard	Engineering Consultants, Inc.	Geology
Kevin Blume	Consoer, Townsend & Assoc., Ltd.	Civil and Structural

Specific observations are discussed below.

b. Dam

The crest and downstream slope of the dam has a heavy grass cover which appears to be adequately protecting the embankment material against surface erosion.

The upstream face shows some evidence of having been scalloped by wave action in the past. This has been stabilized by having riprap dumped on the upstream slope near the crest.

There was no evidence of sloughing or slumping on the downstream face. No seepage was observed below the downstream toe of the embankment or on the embankment slope.

Rodent activity was evident on the exposed portions of the dam. The manager of the development said he had a bulldozer run over the embankment in the past and caused many of the rodent holes to collapse.

A 1/4 inch wide crack was seen on the crest near the break in slope at the downstream face. This crack is 75 feet long and was measured from 175-250 feet from the left abutment. This is believed to be a shrinkage crack.

No outcrops of bedrock were found in the immediate vicinity of the dam. However, based on a knowledge of the geology of the area, well logs, and published geologic maps, the underlying bedrock is the Burlington Limestone (Osagean Series, Mississippian). The rocks of this formation are predominately cherty, crinoidal limestones. These beds are dipping northeastward at about 30 feet per mile.

The surface soils in the embankment were CL-ML materials, most likely of the Dockery and Keswick series. These soils would tend to be easily erodible should overtopping of the embankment occur.

c. Appurtenant Structures

(1) Spillway

The service spillway channel appears to be constructed of non-reinforced concrete which was not trowelled during construction. The channel has been constructed within the past few years and is currently in good condition. No significant erosion or cracking of the concrete was observed during the inspection. The corrugated metal pipe which transports flows from the spillway also appears to be in good condition. Discharges through the pipe will drop onto a poorly constructed concrete pad and flow into the forest downstream of the dam. Erosion of embankment materials will not occur from discharges through this spillway.

The emergency spillway channel contains a thin grass cover. Discharges through the spillway will split and flow in two directions at a point approximately 150 feet downstream of the concrete weir. One part of the flow will proceed to the northwest down a natural hillside and be transported under the road in a 48 inch diameter corrugated metal pipe. The remainder of the water will turn to the east and flow to the downstream toe of the dam in a small channel 10 to 20 feet away from the abutment contact. This water will then be carried under the road in a 24 inch diameter corrugated metal pipe. Some small erosion gullies were observed in the two channels described above, but they are not a hazard to the embankment at this time.

(2) Outlet Works

There is no operating outlet or low level drain pipe at the dam.

d. Reservoir Area

The water surface elevation was 851.06 feet above MSL at the time of inspection.

The reservoir rim is gently sloping with trees and woods near the shore. No evidence of any instability was observed.

e. Downstream Channel

The downstream channel is well defined, with some vegetative and tree growth. No major obstacles or debris were observed along the downstream channel. Some erosion was observed in a few areas.

3.2 Evaluation

The following items were observed which could affect the safety of the dam, or which will require maintenance within a reasonable period of time.

1. Rodent activity in the embankment of the dam.

2. The 1/4 inch wide crack observed on the crest of the dam.

3. Poor concrete work on the service spillway channel and pad downstream of the spillway pipe.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

Lakeview Estates Dam impounds water for recreational uses. There are no specific procedures which are followed in regard to operation of the lake and dam. The water level in the reservoir is controlled by rainfall, runoff, evaporation and by the elevation of the spillway crest. There are no staff gages or monitoring devices to check the water levels. The owner stated that the lake was spring fed and that through the course of the year the water level may vary only 6 or 8 inches.

4.2 Maintenance of Dam

The dam and related structures are maintained by several caretakers and laborers which are hired by the owner.

The dam crest and slopes appear to be maintained well and are free of any saplings or vegetation. Rock riprap has been placed on the upstream face roughly from the crest to the water level. The rocks range in size from 2 to 12 inches and seem to be providing adequate protection against wave action and erosion. Rodent activity was observed on the embankment and should be eliminated.

4.3 Maintenance of Operating Facilities

There are no mechanical facilities at the damsite which require any operation.

4.4 Description of Any Warning System in Effect

The inspection team is not aware of any warning system in effect for this dam.

4.5 Evaluation

Overall, the operation and maintenance for Lakeview Estates Dam appears to be satisfactory.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design

The watershed area of the Lakeview Estates Dam upstream from the dam axis consists of approximately 159 acres. Most of the watershed area is wooded and covered with grass. Land gradients in the higher regions of the watershed average roughly 2 percent, and in the lower areas surrounding the reservoir average about 1 percent. The Lakeview Estates Dam is located on an unnamed tributary of Big Creek. The reservior is about one mile upstream from the confluence of the unnamed tributary and Big Creek. At its longest arm the watershed is approximately 3/4 mile long. A drainage map showing the watershed area is presented as Plate 1 in Appendix B.

Evaluation of the hydraulic and hydrologic features of Lakeview Estates Dam was based on criteria set forth in the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, and additional guidance provided by the St. Louis District of the Corps of Engineers. The Probable Maximum Flood (PMF) was calculated from the Probable Maximum Precipitation (PMP) using the methods outlined in the U.S. Weather Bureau Publication, Hydrometeorological Report No. 33. The probable maximum storm duration was set at 24 hours, and storm rainfall distribution was based on criteria given in EM 1110-2-1411 (Standard Project Storm). The SCS method was adopted for deriving the unit hydrograph, utilizing the Corps

of Engineers' computer program HEC-1, (Dam Safety Version). The unit hydrograph parameters are presented in Appendix B. The SCS method was also used for determining loss rate. The hydrologic soil group of the watershed was determined by use of published soil maps. The hydrologic soil group of the watershed and the SCS curve number are also presented in Appendix B. The curve number, unit hydrograph parameters, PMP index rainfall and the percentages for various durations were directly input to the HEC-1 (Dam Safety Version) computer program to obtain the PMF hydrograph. The computed peak discharge of the PMF and one-half of the PMF are 3,203 cfs and 1,602 cfs respectively.

Both the PMF and one-half of the PMF inflow hydrographs were routed through the reservoir by the Modified Puls Method also utilizing the HEC-1 (Dam Safety Version) computer program. The reservoir was assumed at the service spillway crest level at the start of routing computation. The peak outflow discharges for the PMF and one-half of the PMF are 2,370 and 1,071 cfs respectively. Both the PMF and one-half of the PMF, when routed through the reservoir results in overtopping of the dam.

The stage-outflow relation for the spillway was prepared from field notes, and sketches, prepared during the field inspection. The reservoir stage-capacity data were based on the U.S.G.S. Warrenton Quandrangle topographic map (7.5 minute series). The spillway and overtop rating curve and the reservoir capacity curve are presented in Plates 2 & 3 respectively in Appendix B.

From the standpoint of dam safety, the hydrologic design of a dam aims at avoiding overtopping. Overtopping is especially dangerous for an earth dam because the downrush of waters over the crest will erode the dam embankment and release all the stored water suddenly into the downstream floodplain. The safe hydrologic design of a dam requires a spillway crest height that can handle a very large and exceedingly rare flood without overtopping.

The Corps of Engineers designs its dams to safely pass the Probable Maximum Flood that is estimated could be generated from the upstream watershed. This is the generally accepted criterion for major dams throughout the world, and is the standard for dam safety where overtopping would pose any threat to human life. According to the Corps criteria, the hydrologic requirement for safety for this dam is the capability to pass from one-half Probable Maximum Flood to the Probable Maximum Flood without overtopping.

b. Experience Data

It is believed that no records of reservoir stage or spillway discharge are maintained for this site.

c. Visual Observations

Observations made of the spillway during the visual inspection are discussed in Section 3.1c(1) and evaluated in Section 3.2.

d. Overtopping Potential

As indicated in Section 5.1-a, both the Probable Maximum Flood and one-half of the Probable Maximum Flood, when routed through the reservoir, resulted in overtopping of the dam. The peak outflow discharges for the PMF and one-half of the PMF are 2370 and 1071 cfs respectively. The PMF overtopped the dam crest 1.05 feet and one-half of the PMF overtopped the dam crest by 0.53 feet. The total duration of embankment overflow is 5.92 hours during the PMF, and 4.00 hours during one-half of the PMF. The spillway for Lakeview Estates Dam is capable of passing a flood equal to approximately 17 percent of the PMF just before overtopping the dam.

The computed one percent and ten percent chance floods using 100-year and 10-year, 24 hour rainfall data respectively, were routed through the reservoir, and are given in the last section in Appendix B. The routing results indicate the spillway/reservoir system will accomodate the 10-year flood without overtopping the dam and the dam will be overtopped by 0.19 feet during the occurence of the 100-year flood.

The failure of the dam could cause extensive damage to the property downstream of the dam and possible loss of life. Within the estimated two mile damage zone downstream of the dam are four houses, one gravel road crossing, one railroad crossing, one trailer park, and a crossing of Interstate Highway No. 70.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

There were no signs of settlement or distress on the embankment or foundation other than evidence of prior wave erosion. The crack observed on the embankment crest is thought to be a shrinkage crack and does not indicate structural problems with the embankment.

The entire dam portions appears to be protected by vegetation or riprap. No signs of seepage were observed at any location in the vicinity of the damsite. Some rodent activity was still observed on the upstream and downstream embankment slopes. This should be arrested by eliminating all rodents from the embankment.

The concrete on the service spillway channel and the pad downstream of the corrugated metal pipe appears to have been poorly placed. The condition of the spillway structure appears to be satisfactory at this time, but should be monitored for potential future degradation of its condition.

b. Design and Construction Data

No design or construction data relating to the structural stability of the dam or appurtenant structures were found.

c. Operating Records

No operating records are available relating to the stability of the dam or appurtenant structures. Water levels have not been recorded, however, the reservoir level was 3/4 inch above the crest of the service spillway on the day of inspection, and is assumed to be close to full at all time.

d. Post Construction Changes

No post construction changes exist which will effect the structural stability of the dam.

e. Seismic Stability

According to the Seismic Zone Map of Contiguous States, Form TM 5-809-10/ NAVFAC P-355/AFM 88-3 Chapter 13; April 1973 the portion of Missouri in which Lakeview Estates Dam is located is in Seismic Zone 2. The engineer performing the stability analysis on the embankment should determine the necessity of a seismic analysis for this embankment.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment

The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

It should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team.

It is also important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that an unsafe condition could be detected.

a. Safety

The spillway capacity of Lakeview Estates Dam was found to be "Seriously Inadequate". The spillway/reservoir system will accomodate only 17 percent of the PMF without overtopping the dam.

The surface soils in the embankment are silty soils. The PMF overtops the dam by a maximum depth of over one foot. The duration of embankment overflow during the PMF is about 6 hours. If the body of the dam is made up of silty soils, overtopping could result in dam failure.

The dam appears to be in generally satisfactory condition. Maintenance at the damsite is good. The major item requiring attention is the need for elimination of all rodents from the embankment. Seepage and stability analyses should be performed on the embankment to insure its safety.

The concrete service spillway channel and downstream pad appears to be in satisfactory condition at this time. However, degradation and erosion of the concrete is possible, and repairs should be made as required.

b. Adequacy of Information

Adequate information concerning the dam and appurtenant structures is not available. No seepage and stability analyses were available for review.

c. Urgency

The remedial measures recommended in Paragraph 7.2 should be accomplished within a reasonable period of time. The items recommended in paragraph 7.2a should be pursued on a high priority basis.

d. Necessity for Phase II Inspection

Based on results of the Phase I inspection, and if the remedial measures recommended in Paragraph 7.2 are undertaken as soon as possible, a Phase II inspection is not felt to be necessary.

7.2 Remedial Measures

a. Alternative

1. Spillway capacity and/or height of dam should be increased to pass the PMF without overtopping the dam.

b. O & M Procedures

1. Eliminate all rodents from the embankment.

2. Monitor the condition of the concrete in the channel and downstream pad of the service spillway, and make repairs as required.

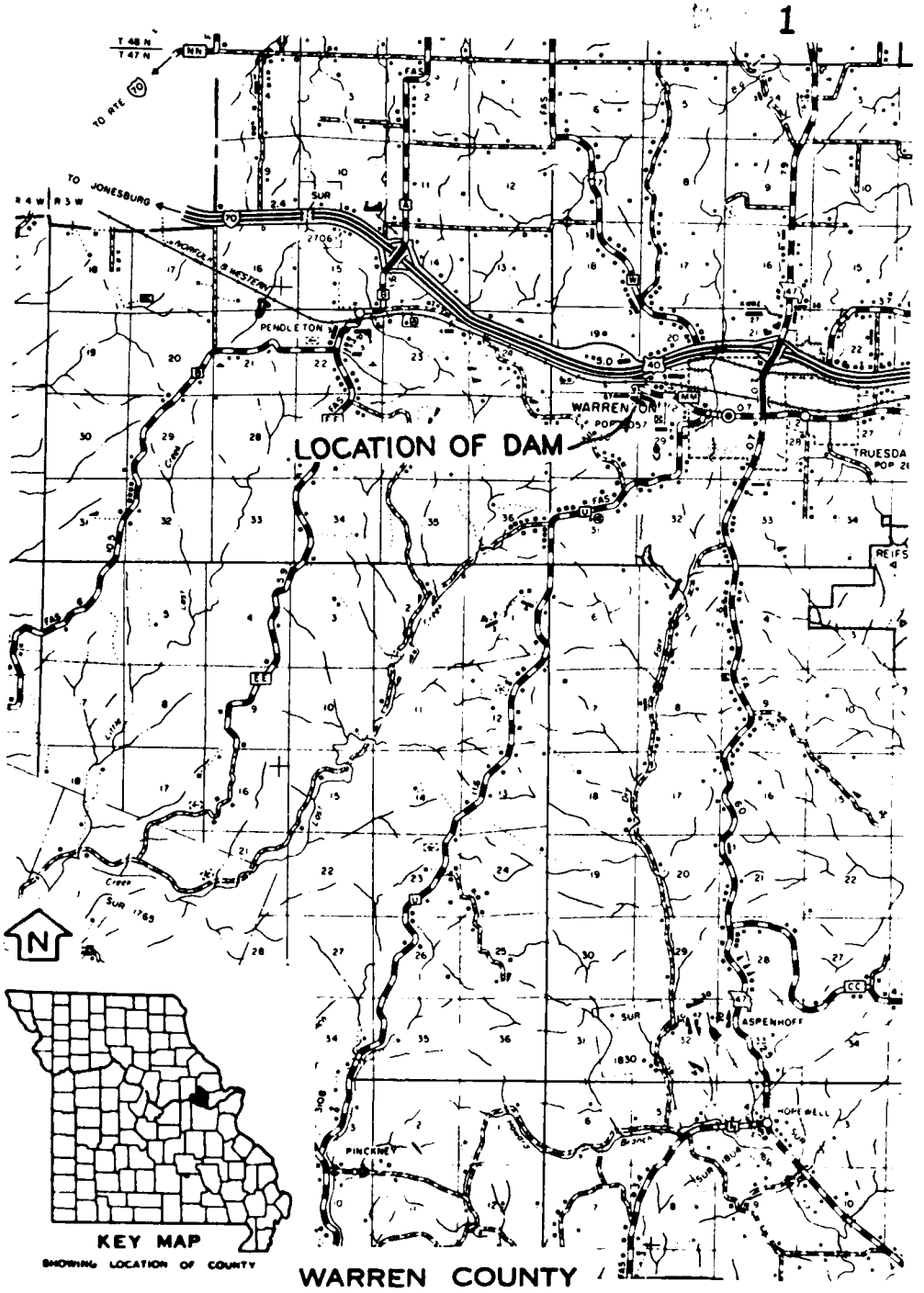
3. The owner should initiate the following programs.

(a) Periodic inspection of the dam by a professional engineer experienced in the design and construction of earthen dams.

(b) Set up a maintenance schedule and log all visits to the dam for operation, repairs and maintenance.

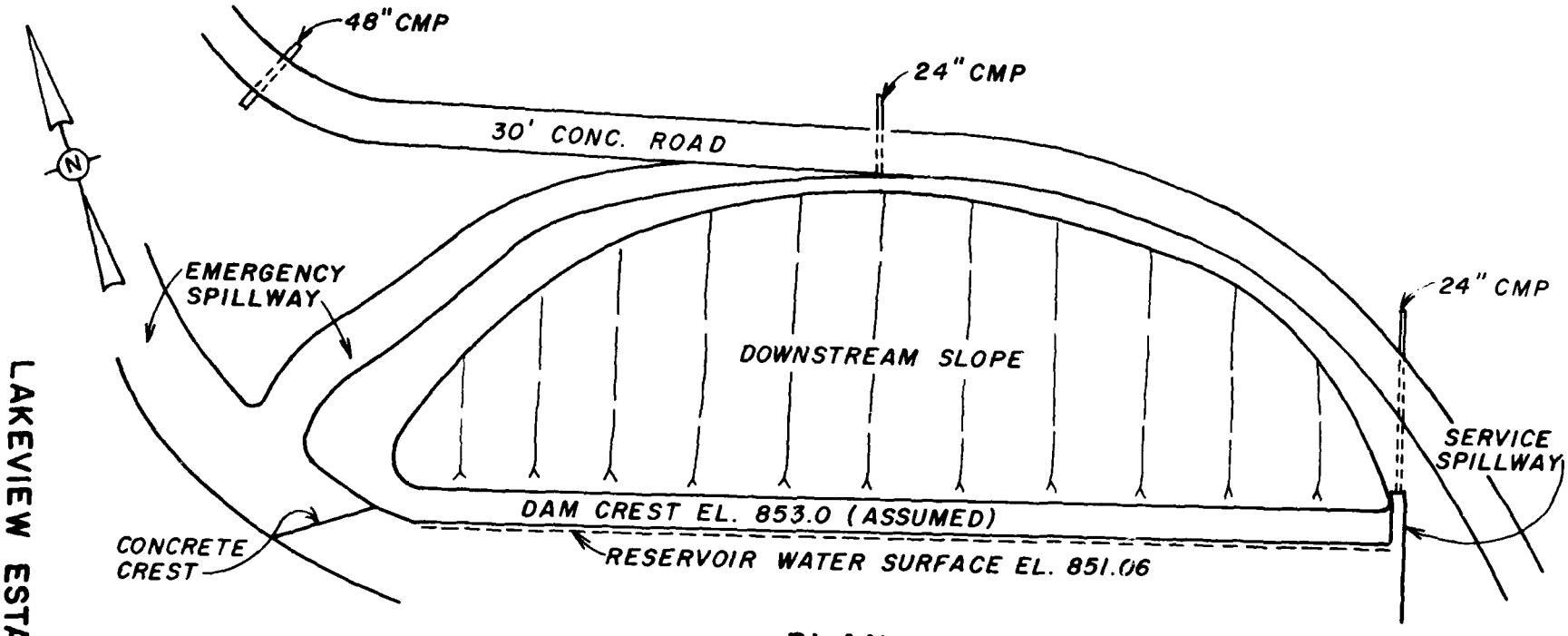
(c) Seepage and stability analyses should be performed by a professional engineer experienced in the design and construction of earth dams.

PLATES

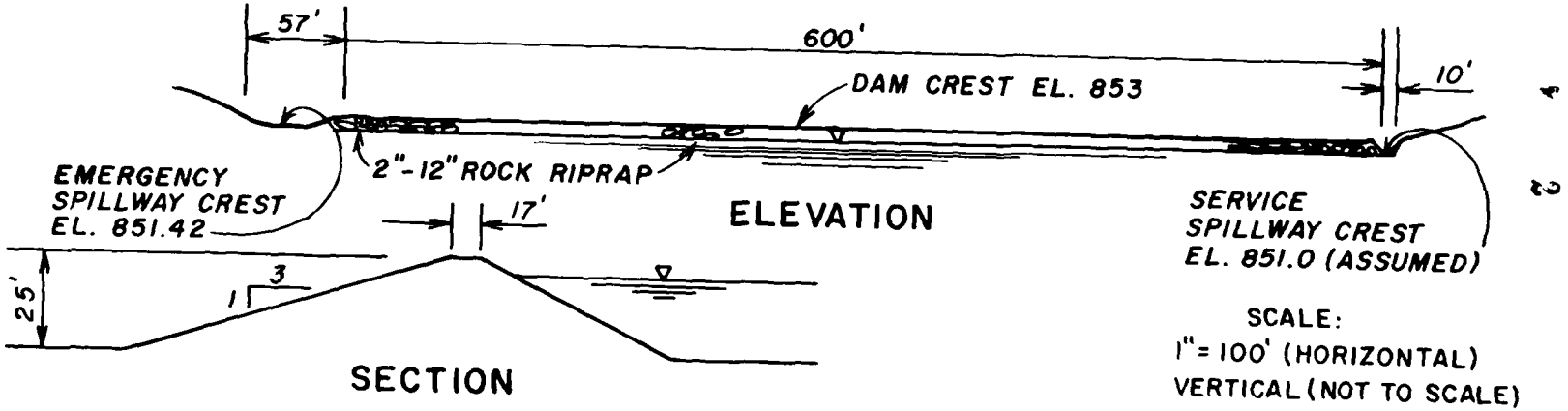


LOCATION MAP – LAKEVIEW ESTATES DAM

LAKEVIEW ESTATES DAM (MO. 11004)
PLAN, ELEVATION & SECTION

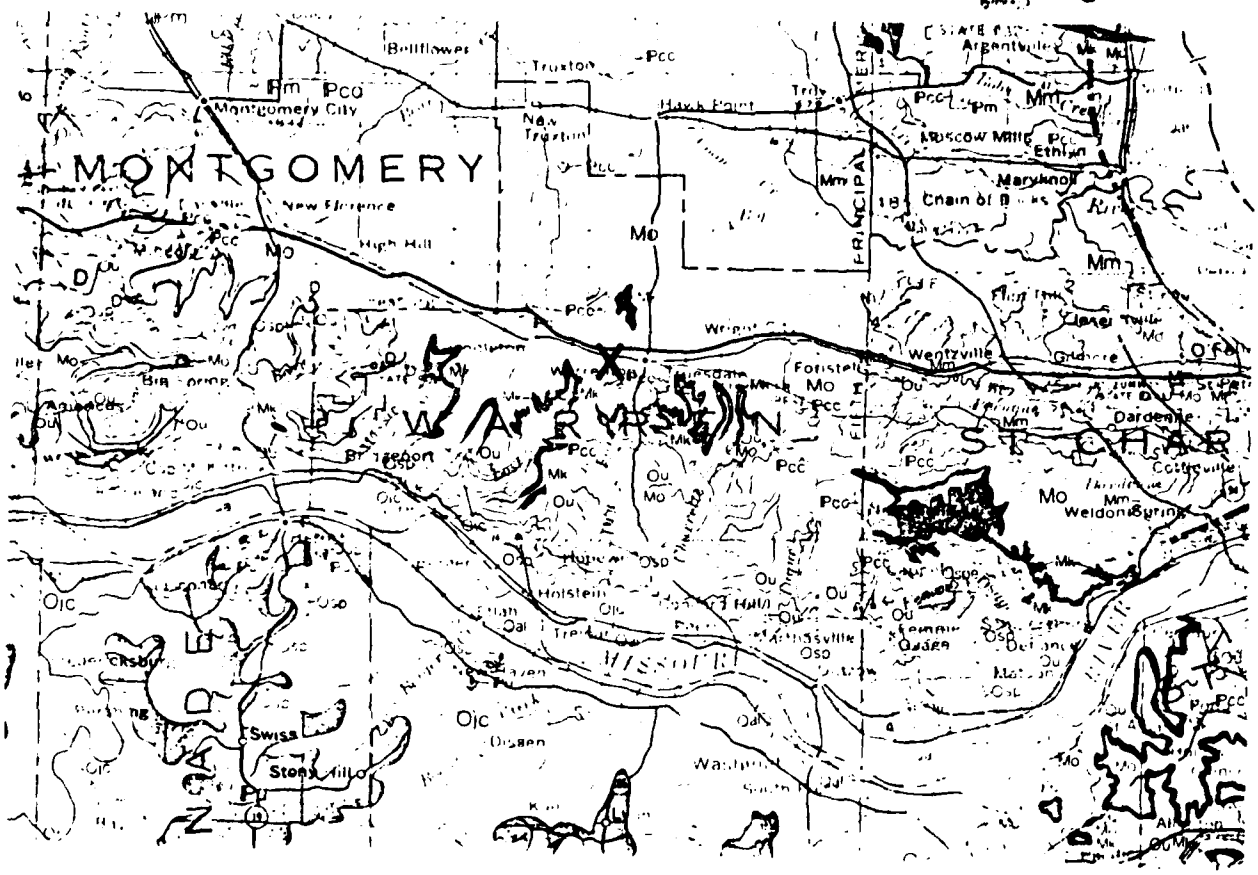


PLAN



SECTION

SCALE:
1" = 100' (HORIZONTAL)
VERTICAL (NOT TO SCALE)



QUARTERNARY { Qal - ALLUVIUM

PENNSYLVANIAN {
- Pm - MARMATON GROUP
- Pcc - CHEROKEE GROUP

MISSISSIPPIAN {
- Mm - ST. LOUIS LIMESTONE
  SALEM FORMATION
  WARSAW FORMATION
- Mo - BURLINGTON-KEOKUK FORMATION
- Mk - CHOTEAU GROUP

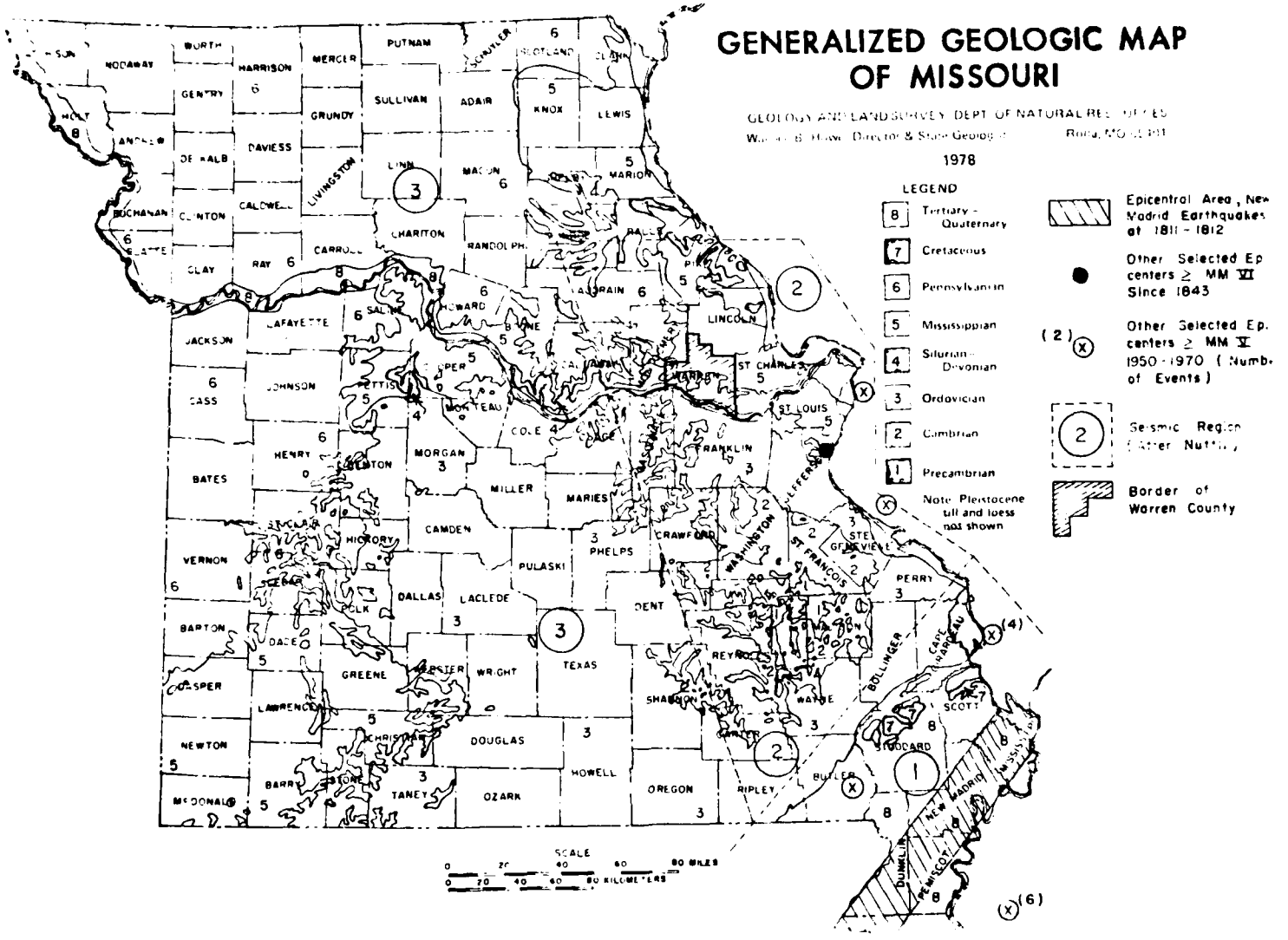
ORDOVICIAN {
- Ou - NOIX LIMESTONE
  MAQUOKETA SHALE
  CAPE LIMESTONE
  KIMMSWICK FORMATION
  DECORAH FORMATION
  PLATTIN FORMATION
  JOACHIM DOLOMITE
- Osp - ST. PETER SANDSTONE
- Ojc - COTTER-POWELL FORMATION
  JEFFERSON CITY DOLOMITE

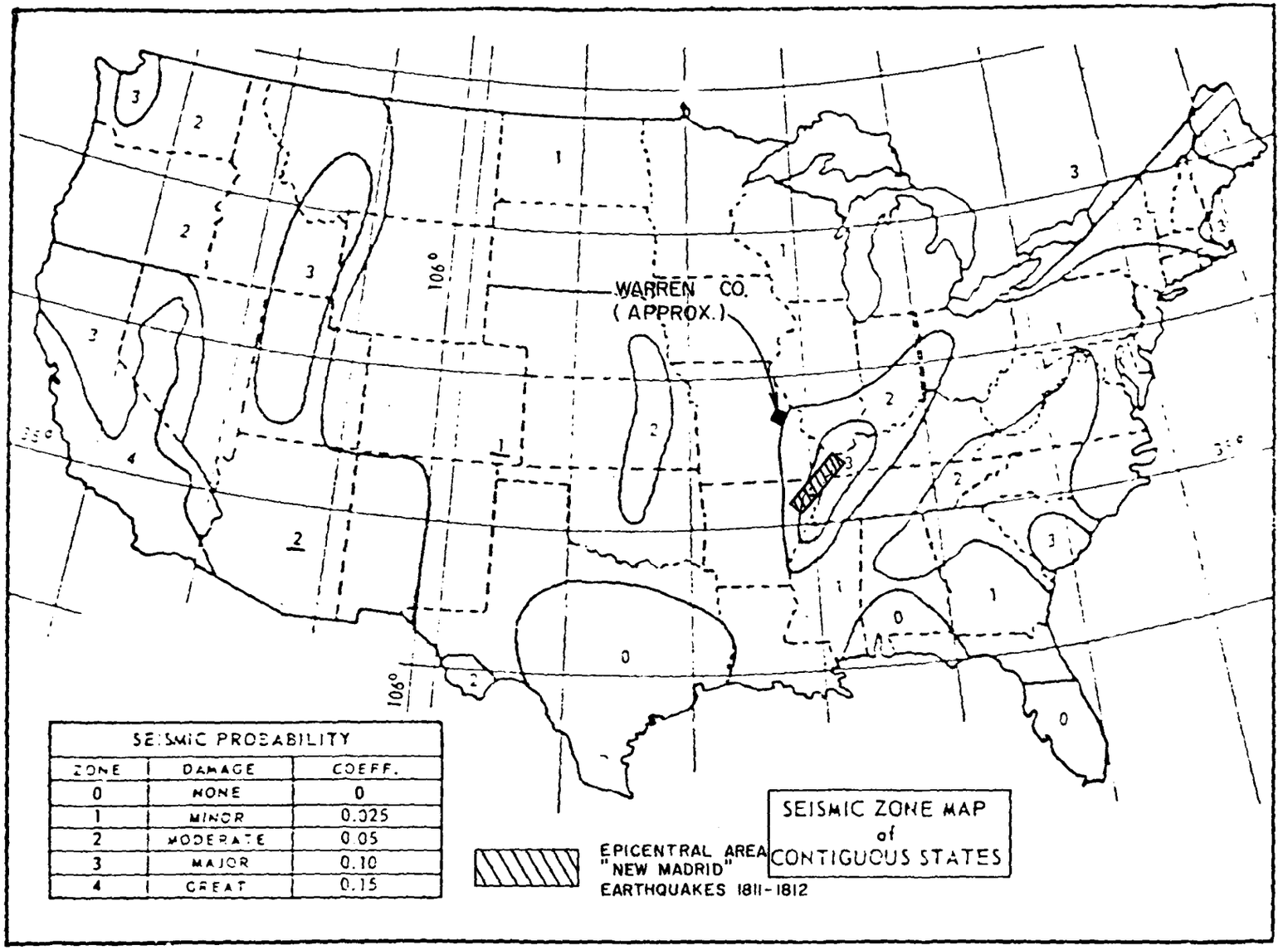
X LOCATION OF DAM MO. 11004

REFERENCE:
GEOLOGIC MAP OF MISSOURI, MISSOURI GEOLOGIC SURVEY, 1979.

10 0 10
SCALE OF MILES

GEOLOGIC MAP OF WARREN COUNTY AND ADJACENT AREA


GENERALIZED GEOLOGIC MAP OF MISSOURI
GEOLOGY AND LAND SURVEY DEPT OF NATURAL RESOURCES
1978
LEGEND
8 Tertiary - Quaternary
7 Cretaceous
6 Pennsylvanian
5 Mississippian
4 Silurian - Devonian
3 Ordovician
2 Cambrian
1 Precambrian
Note: Pleistocene till and loess not shown
Epicentral Area, New Madrid Earthquakes of 1811 - 1812
Other Selected Ep centers ≥ MM VI Since 1843
Other Selected Ep. centers ≥ MM V 1950 - 1970 (Numb. of Events)
Seismic Region (After Nuttli)
Border of Warren County
SCALE
0 20 40 60 80 MILES
0 20 40 60 80 KILOMETERS
NODAWAY
WORTH
HARRISON
MERCER
PUTNAM
SCHUYLER
SCOTLAND
CLARK
GENTRY
GRUNDY
SULLIVAN
ADAIR
KNOX
LEWIS
HOLT
ANDREW
DE KALB
DAVIESS
LIVINGSTON
LINN
MACON
MARION
BUCHANAN
CLINTON
CALDWELL
CHARITON
RANDOLPH
CLAY
RAY
CARROLL
SHELBY
HOWARD
SALINE
LAFAYETTE
JACKSON
JOHNSON
CASS
PETTIS
MONITEAU
COOPER
COLE
CALLAWAY
MONTGOMERY
WARREN
ST CHARLES
LINCOLN
ST LOUIS
FRANKLIN
JEFFERSON
WASHINGTON
HENRY
MORGAN
BATES
BENTON
MILLER
MARIES
CRAWFORD
STE GENEVIEVE
ST FRANCOIS
PERRY
CAMDEN
PULASKI
PHELPS
VERNON
HICKORY
DALLAS
LACLEDE
DENT
BARTON
CEDAR
POLK
GREENE
WEBSTER
WRIGHT
TEXAS
REYNOLDS
SHANNON
WAYNE
BOLLINGER
CAPE GIRARDEAU
SCOTT
CRAWFORD
LAWRENCE
NEWTON
CHRISTIAN
DOUGLAS
HOWELL
STODDARD
BARRY
STONE
TANEY
OZARK
OREGON
RIPLEY
BUTLER
MCDONALD
DUNKLIN
PEMISCOT
NEW MADRID
MISSISSIPPI


WARREN CO.
(APPROX.)
106°
106°
35°
35°
SEISMIC PROBABILITY
ZONE | DAMAGE | COEFF.
0 | NONE | 0
1 | MINOR | 0.025
2 | MODERATE | 0.05
3 | MAJOR | 0.10
4 | GREAT | 0.15
EPICENTRAL AREA "NEW MADRID" EARTHQUAKES 1811-1812
SEISMIC ZONE MAP of CONTIGUOUS STATES

APPENDIX A

PHOTOGRAPHS TAKEN DURING INSPECTION

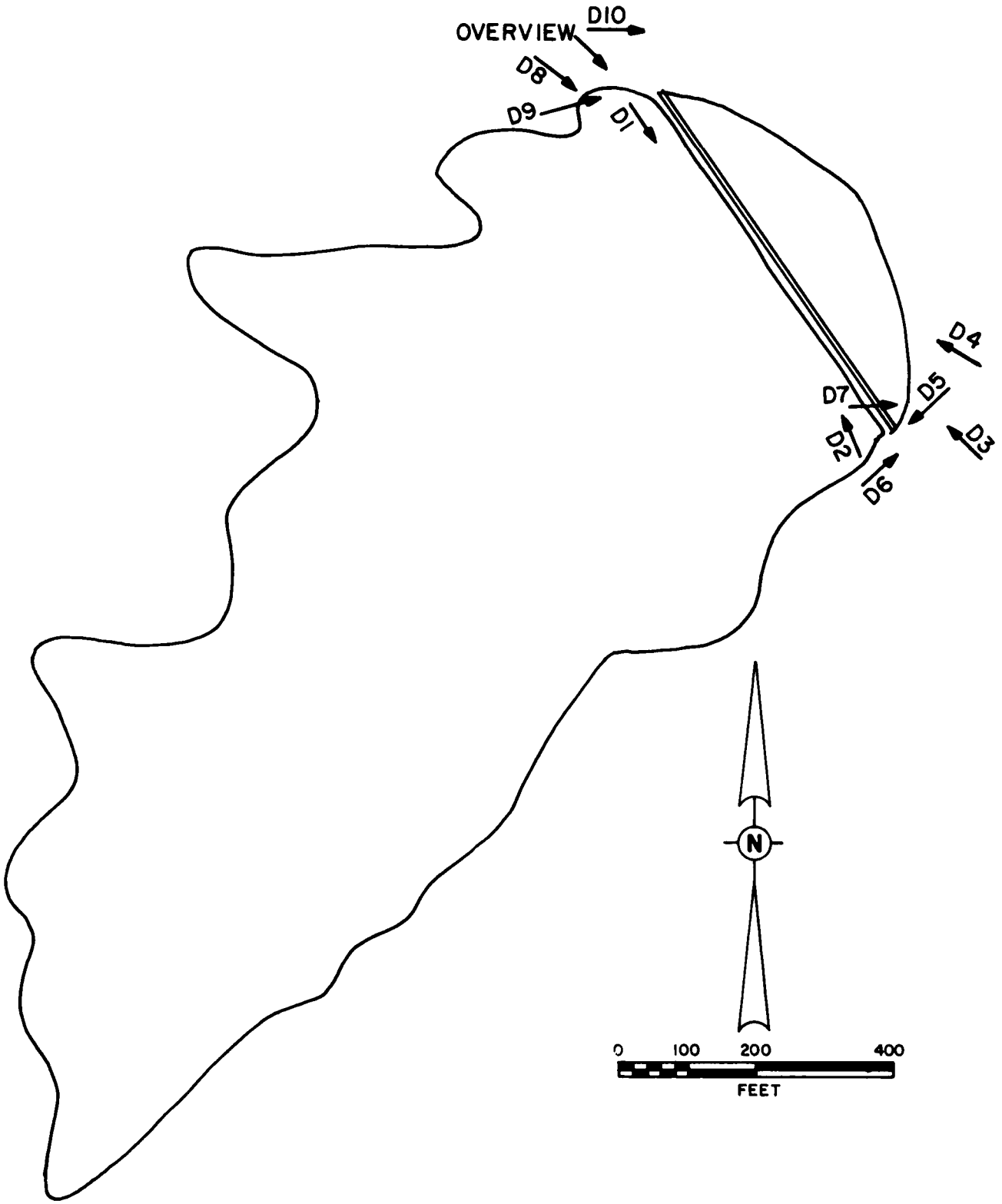


PHOTO INDEX
FOR
LAKEVIEW ESTATES DAM

LAKEVIEW ESTATES DAM

D1 - Crest and Upstream Embankment Slope

D2 - Upstream Embankment Slope

D3 - Downstream Embankment Slope

D4 - Downstream Embankment Slope

D5 - Service Spillway

D6 - Pipe Under Road Downstream of Service Spillway

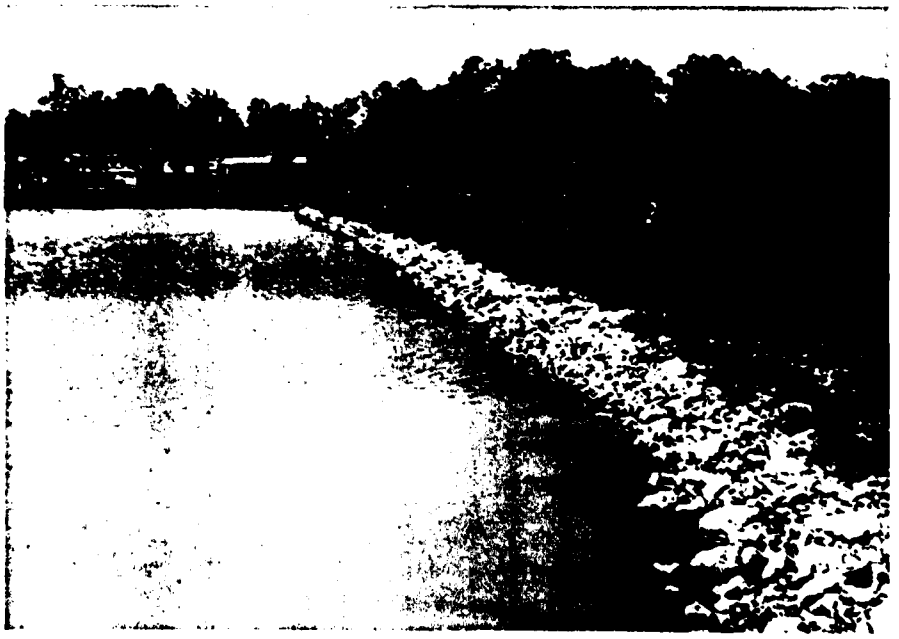
D7 - Discharge End of Service Spillway Pipe

D8 - Emergency Spillway

D9 - Emergency Spillway Discharge Channel

D10 - Emergency Spillway Discharge Channel

D1



D2

D3

D4

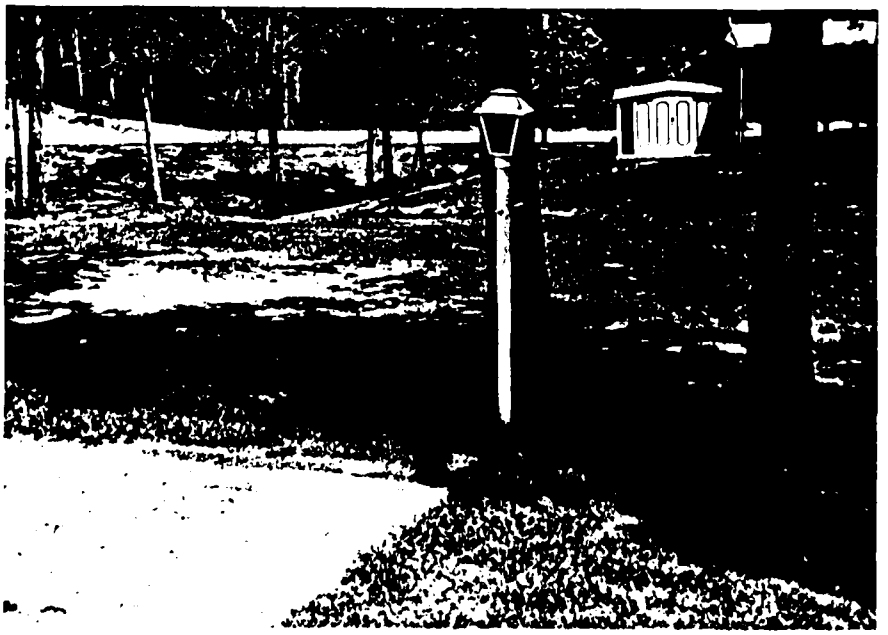
D5

D6

D7

D8

D9

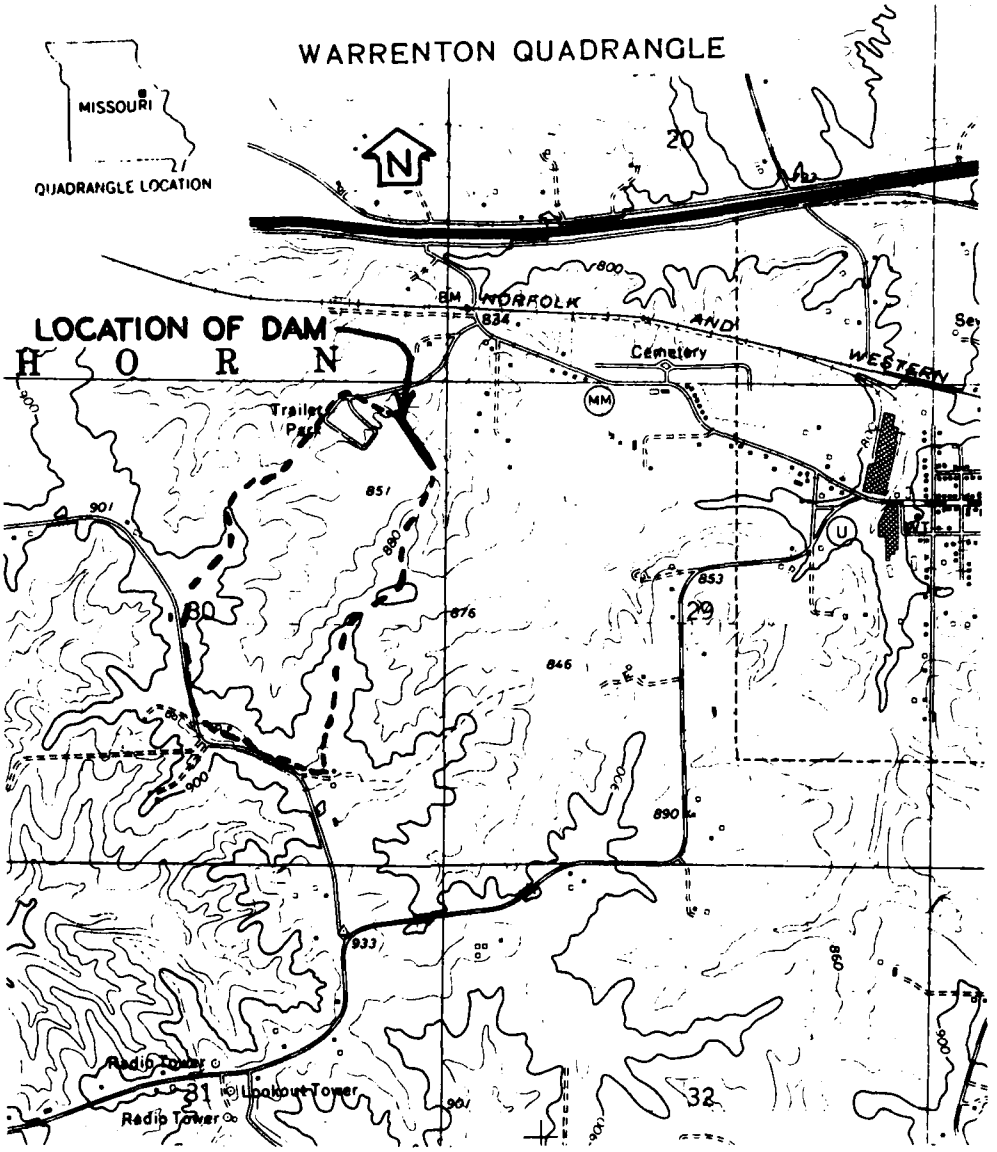


D10

APPENDIX B

HYDROLOGIC COMPUTATIONS

PLATE-1, APPENDIX-B



LAKEVIEW ESTATES DAM (MO.11004)
DRAINAGE BASIN

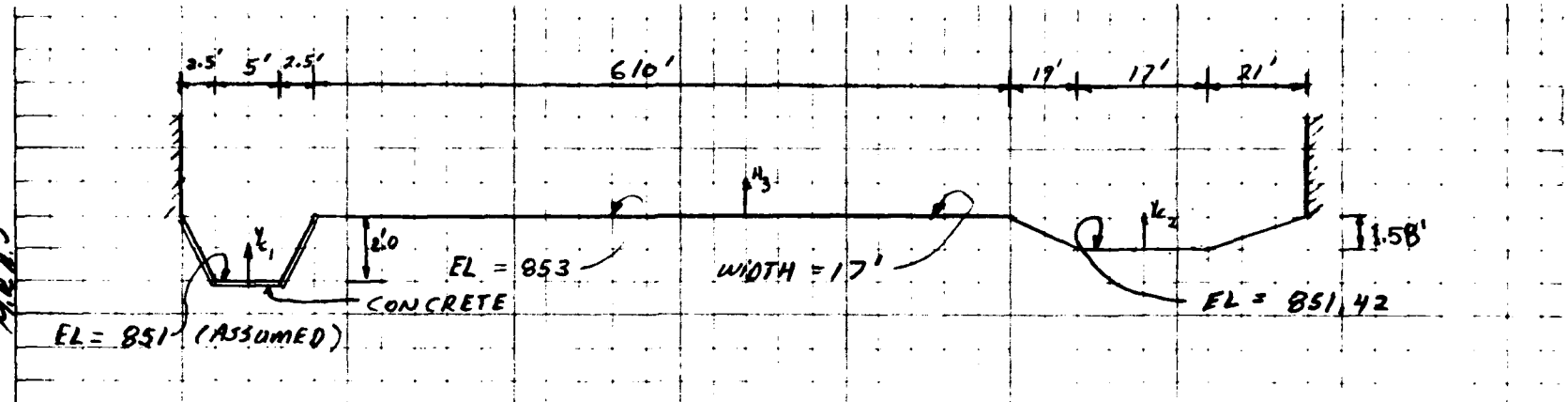
ENGINEERING CONSULTANTS, INC.

DAM SAFETY INSPECTION - MISSOURI — SHEET NO. 1 OF

MISSOURI DAM 11004 — JOB NO. 1240-00-1

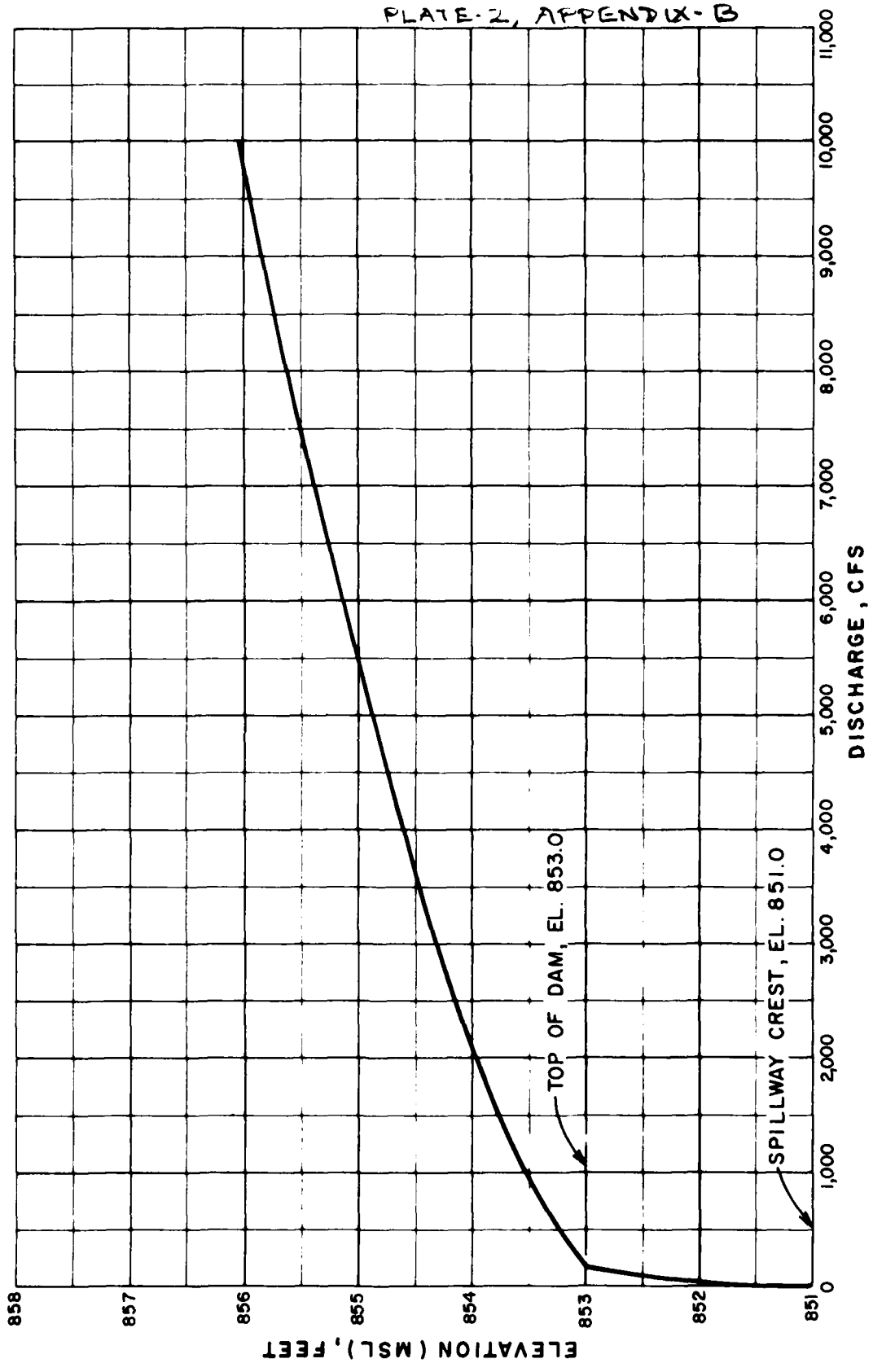
SPILLWAY AND OVERTOP DISCHARGE RATING CURVE — BY DNZ MEM DATE 5-22-25

EC1-4



Y_{c_1} Ft	A_{c_1} (Ft^2)	$V_{c_1} = 5.67\sqrt{\frac{A_{c_1}}{T_{c_1}}}$	$Q_{c_1} = A_{c_1} \cdot V_{c_1}$ (cfs)	$\frac{V_{c_1}^2}{2g}$	u/s w.s. $= Y_{c_1} + \frac{V_{c_1}^2}{2g} + 851$	$Y_{c_2} \approx \frac{2}{3}$(u/s w.s. $- 851.42$)	A_{c_2}	T_{c_2}	V_{c_2}	$Q_{c_2} = A_{c_2} \cdot V_{c_2}$	Y_3	L_3	C_3	$Q_3 = C_3 L_3 Y_3^{3/2}$	$Q_T = Q_{c_1} + Q_{c_2} + Q_3$
0	0	0	0	0	851	0	–	–	–	–	–	–	–	–	0
.42	2.32	3.51	8.15	.19	851.61	0.13	2.42	20.29	1.96	4.74	–	–	–	–	13
1	6.25	5.18	32.38	.42	852.42	.67	17.07	33.97	4.02	68.62	–	–	–	–	101.
1.3	8.61	5.79	49.88	.52	852.82	.93	26.76	40.54	4.61	123.27	–	–	–	–	173.
1.5	10.31	6.15	63.41	.59	853.09	1.11	34.47	45.10	4.96	170.86	.09	610	2.68	44.14	278.
2.0	15.0	6.94	104.16	.75	853.75	1.55	56.76	56.24	5.70	323.32	.75	610	2.64	1,046.0	1474
2.5	20.0	8.02	160.37	1.0	854.5	2.05	85.25	57.0	6.93	591.14	1.5	610	2.64	2,958.5	3,710.
3.0	25.0	8.97	224.1	1.25	855.25	2.55	113.8	57.0	8.01	911.5	2.25	610	2.63	5414.5	6550.
3.5	30	9.82	294.6	1.5	856.0	3.05	142.3	57.0	8.96	1275.0	3.0	610	2.63	8336.2	9,907

PLATE-2, APPENDIX-B



LAKEVIEW ESTATES DAM (MO. 11004)
SPILLWAY & OVERTOP RATING CURVE

ECI-4 ENGINEERING CONSULTANTS, INC.

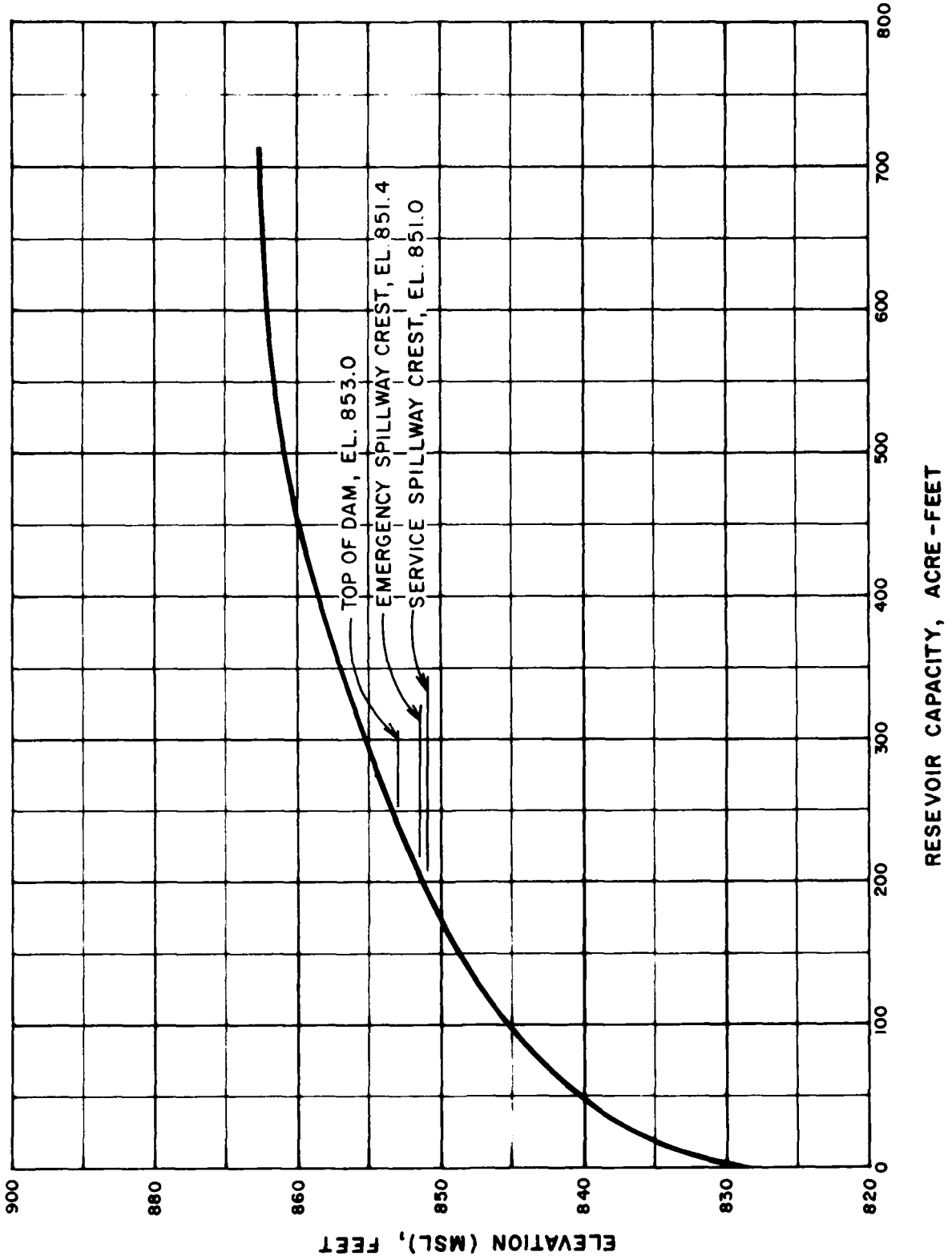
Dam Safety Inspection - Missouri SHEET NO. 1 OF
Lakeview Estates Dam - #11004 JOB NO. 1240
Reservoir Area Capacity BY M.R.H. DATE 5-15-79
V MAS

Lakeview Estates Dam

Reservoir Area Capacity

Elev. M.S.L. (Ft.)	Reservoir Surface Area (Acres)	Incremental Volume (Ac.-Ft.)	Total Volume (Ac.-Ft.)	Remarks
828	0	-	0	Est. Streambed at Center of Dam.
851	25	192	192	Water Surface as shown on Quadrangle. (Spillway)
851.4	25.5	10	202	Spillway Crest (Emergency)
853	27.5	21	223	Top of Dam
860	37	226	449	
880	78	2300	2749	

PLATE-3, APPENDIX-B



LAKEVIEW ESTATES DAM (MO. 11004)
RESERVOIR CAPACITY CURVE

DAM NO MO 11004

DETERMINATION OF PMP

1. Determine drainage area of the basin

   D.A. = 159 ACRES

2. Determine PMP Index Rainfall

   Location of centroid of basin:

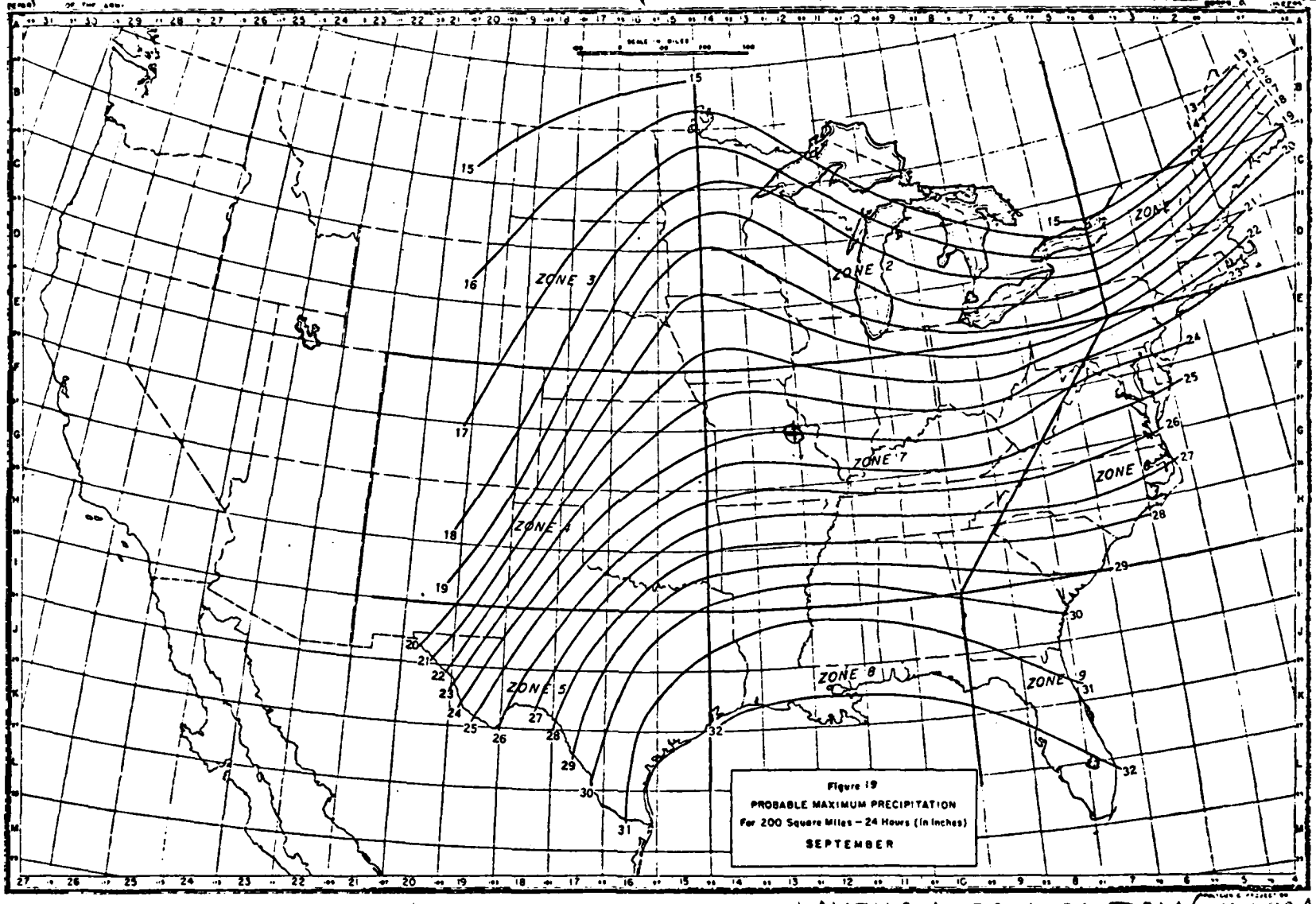
   Long. = 38°48'32", Lat. = 91°10'35" ⇒ PMP = 24"

3. Determine basin rainfall isoterms of percentage of PMP Index Rainfall for various durations:

   Location: Long. = 91°10'35", Lat. = 38°48'32"

   ⇒ Zone 7

Duration (Hrs.)	Percent of Index Rainfall (%)	Total Rainfall (inches)	Rainfall Increments (inches)	Duration of Increment (Hrs.)
6	100	24	24	6
12	120	28.8	4.8	6
24	130	31.2	2.4	12



PMP FOR 200 SQ. MI. - 24 HOURS
DURATION = 24".

LAKEVIEW ESTATES DAM (VA. 00054)
LOCATION OF CENTROID OF WATERSHED
LONG. = 79°10'35" LAT. = 38°48'32"

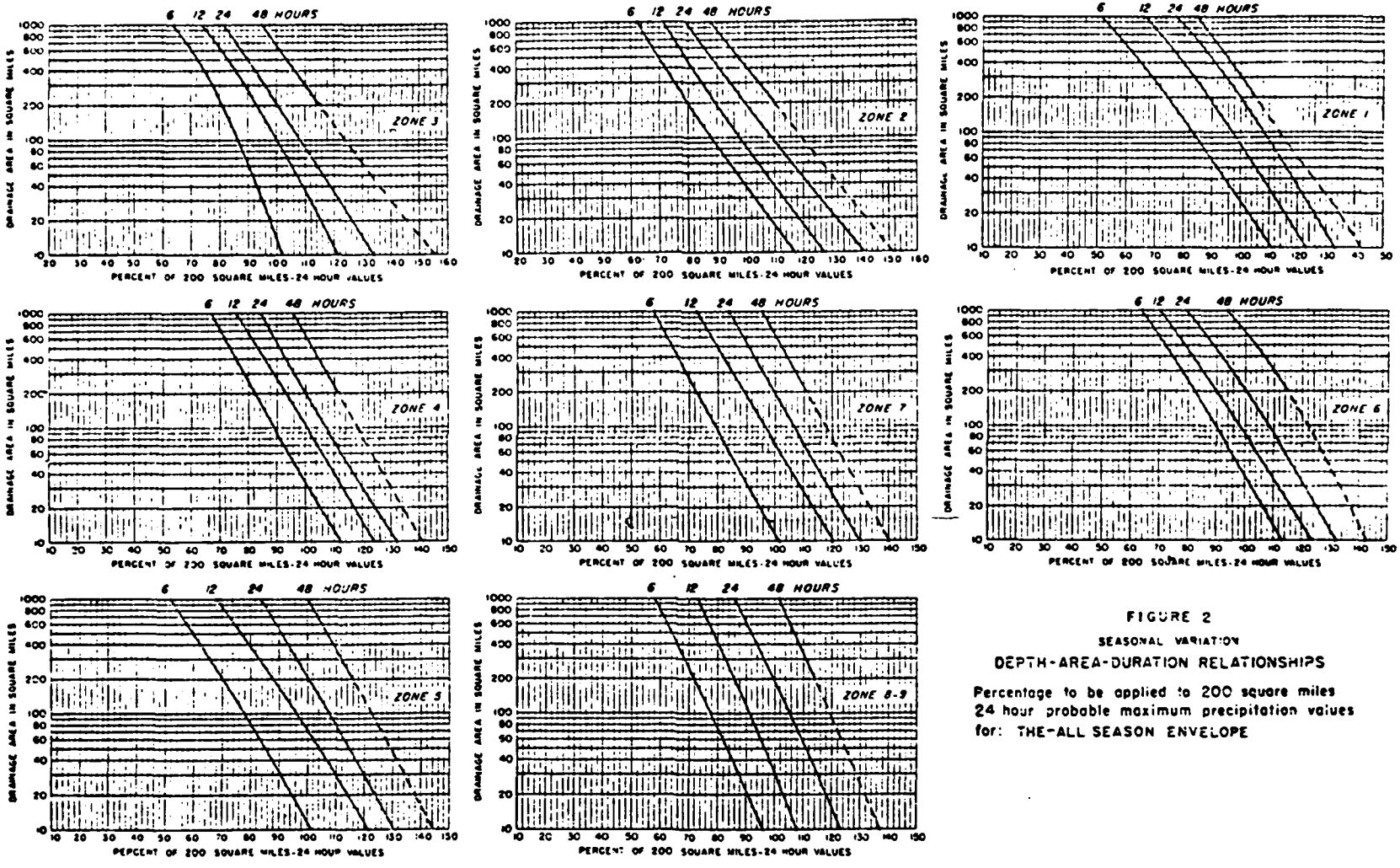


FIGURE 2

SEASONAL VARIATION

DEPTH-AREA-DURATION RELATIONSHIPS

Percentage to be applied to 200 square miles 24 hour probable maximum precipitation values for: THE-ALL SEASON ENVELOPE

ECI-4 ENGINEERING CONSULTANTS, INC.

DAM SAFETY INSPECTION - Missouri — SHEET NO. 1 OF
DAM #11004 — JOB NO. 1240-001-1
UNIT HYDROGRAPH PARAMETERS — BY KLB DATE 5-29-79

1. DRAINAGE AREA, $A = 159\ Ac = 0.25\ SQ.\ Mi.$

2. LENGTH OF STREAM = (1.13" X 2000' = 2260') = 0.43 mi.

3. ELEVATION AT DRAINAGE DIVIDE ALONG THE LONGEST STREAM, $H_1 = 925'$

4. RESERVOIR ELEVATION AT THE SPILLWAY CREST, $H_2 = 851'$

5. DIFFERENCE IN ELEVATION, $\Delta H = 925 - 851 = 74'$

6. AVERAGE SLOPE OF STREAM = $\frac{\Delta H}{L} = \frac{74}{2260} = 3.3\ \%$

7. TIME OF CONCENTRATION:

a) By KIRPICH FORMULA:

$$T_c = \left(\frac{11.9 \times L^3}{\Delta H}\right) = \left(\frac{11.9 \times 0.43^3}{74}\right)^{0.385} = 0.19\ HR$$

b) By VELOCITY ESTIMATE:

AVERAGE SLOPE = 3.3 % ⇒ 3 FPS

$$\therefore T_c = \frac{0.43 \times 5280}{3 \times 60 \times 60} = 0.21\ HR$$

USE $T_c = 0.20$ HR

8. LAG TIME = $0.6 \times T_c = 0.6 \times 0.20 = 0.12$ HR

9. UNIT DURATION = $D \leq \frac{L_t}{3} = \frac{0.12}{3} = 0.04 \leq 0.083$

USE D = 0.083 HR. = 5 MIN.

10. Time To PEAK, $T_p = \frac{D}{2} + L_t = \frac{0.083}{2} + 0.12 = 0.16$ HR

11. PEAK DISCHARGE, $q_p = \frac{484 \cdot A}{T_p} = \frac{484 \times (0.25)}{0.16}$

$q_p = 756$ CFS

ECI-4 ENGINEERING CONSULTANTS, INC.

DAM SAFETY INSPECTION / MISSOURI SHEET NO. 1 OF

DAM * 11004 JOB NO. 1240-001

DETERMINATION OF SOIL GROUP & CURVE NUMBER BY MAS DATE 5/31/7

MISSOURI DAM * 11004

DETERMINATION OF HYDROLOGIC SOIL GROUP & SCS CURVE NUMBER

1. The watershed soils consist of C & D group soils. Group 'D' type soil is predominent.

   Assume Soil Group 'D' for the entire watershed.

2. Most of the watershed is wooded and covered with grass. Assume 'Fair' hydrologic condition for infiltration.

   Thus CN = 79 for Soil Group D & AMC-II

   $\Rightarrow$ CN = 91 for AMC-III

HEC1DB INPUT DATA

```
***********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
***********************************
A                       DAM SAFETY INSPECTION - MISSOURI
A                          LAKEVIEW ESTATES DAM (11004)
A                 PMF AND 50 PERCENT PMF DETERMINATION AND ROUTING
B     300       0       1       0       0       0       0       0       0       0
B1      5
J       1       2       1
J1    1.0      0.
K       0   11004                                       1
K1  INPUT INDEX PRECIPITATION AND RATIOS, INPUT SCS UNIT HYDROGRAPH PARAMETERS
M       1       2    0.25            0.25     1.0
P            24.0     100     120     130
T                                                      -1   -91.0
W2           0.12
X       0       0       1
K       1   30017                       2               1
K1  ROUTE HYDROGRAPH THROUGH LAKEVIEW ESTATES DAM
Y                               1       1
Y1      1                                          -851.0      -1
Y4851.00  851.61  852.42  852.82  853.00  853.09  853.75  854.50  855.25  856.00
Y5      0      11     101     173     190     278    1474    3719    6550    9907
$S     0.    172.    202.    225.    449.   2749.
$E   826.    851.   851.4    853.    855.    860.
$$   851.
$D   857.
K      99
```

INFLOW PMF AND ONE-HALF PMF HYDROGRAPHS

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********

RUN  DATE= 79/08/15.
     TIME= 08.49.18.
```

DAM SAFETY INSPECTION - MISSOURI
LAKEVIEW ESTATES DAM (11004)
ONE AND 50 PERCENT PMF DETERMINATION AND ROUTING

JOB SPECIFICATION

NW	NWR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	3	5	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 2 LRTIO= 1

RTIOS= 1.00 .50

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INPUT INDEX PRECIPITATION AND RATIOS, INPUT SCS UNIT HYDROGRAPH PARAMETERS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11004	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.25	0.00	.25	1.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	24.00	100.00	120.00	130.00	0.00	0.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-91.00	0.00	0.00

CURVE NO = -91.00 WETNESS = -1.00 EFFECT CN = 91.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= .12

RECESSION DATA
STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

TIME INCREMENT TOO LARGE--(DTHG IS GT LAG/2)

UNIT HYDROGRAPH 9 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= .12 VOL= 1.00

	376.	750.	470.	174.	84.	36.	16.	7.	3.

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	0.00	.01	0.	1.01	12.35	151	.20	.20	.00	379.
1.01	.10	2	.01	0.00	.01	0.	1.01	12.40	152	.20	.20	.00	380.
1.01	.15	3	.01	0.00	.01	0.	1.01	12.45	153	.20	.20	.00	381.
1.01	.20	4	.01	0.00	.01	0.	1.01	12.50	154	.20	.20	.00	381.
1.01	.25	5	.01	0.00	.01	0.	1.01	12.55	155	.20	.20	.00	382.
1.01	.30	6	.01	0.00	.01	0.	1.01	13.00	156	.20	.20	.00	382.
1.01	.35	7	.01	0.00	.01	0.	1.01	13.05	157	.24	.24	.00	397.
1.01	.40	8	.01	0.00	.01	0.	1.01	13.10	158	.24	.24	.00	427.
1.01	.45	9	.01	0.00	.01	0.	1.01	13.15	159	.24	.24	.00	446.
1.01	.50	10	.01	0.00	.01	0.	1.01	13.20	160	.24	.24	.00	454.
1.01	.55	11	.01	0.00	.01	0.	1.01	13.25	161	.24	.24	.00	457.
1.01	1.00	12	.01	0.00	.01	0.	1.01	13.30	162	.24	.24	.00	459.
1.01	1.05	13	.01	0.00	.01	0.	1.01	13.35	163	.24	.24	.00	460.
1.01	1.10	14	.01	0.00	.01	0.	1.01	13.40	164	.24	.24	.00	460.
1.01	1.15	15	.01	.00	.01	0.	1.01	13.45	165	.24	.24	.00	460.
1.01	1.20	16	.01	.00	.01	0.	1.01	13.50	166	.24	.24	.00	461.
1.01	1.25	17	.01	.00	.01	0.	1.01	13.55	167	.24	.24	.00	461.
1.01	1.30	18	.01	.00	.01	1.	1.01	14.00	168	.24	.24	.00	461.
1.01	1.35	19	.01	.00	.01	1.	1.01	14.05	169	.30	.30	.01	494.
1.01	1.40	20	.01	.00	.01	2.	1.01	14.10	170	.30	.30	.00	528.
1.01	1.45	21	.01	.00	.01	3.	1.01	14.15	171	.30	.30	.00	556.
1.01	1.50	22	.01	.00	.01	3.	1.01	14.20	172	.30	.30	.00	568.
1.01	1.55	23	.01	.00	.01	4.	1.01	14.25	173	.30	.30	.00	573.
1.01	2.00	24	.01	.00	.01	4.	1.01	14.30	174	.30	.3	.00	576.
1.01	2.05	25	.01	.00	.01	5.	1.01	14.35	175	.30	.30	.00	577.
1.01	2.10	26	.01	.00	.01	5.	1.01	14.40	176	.30	.30	.00	577.
1.01	2.15	27	.01	.00	.01	6.	1.01	14.45	177	.30	.30	.00	578.
1.01	2.20	28	.01	.30	.01	6.	1.01	14.50	178	.30	.30	.00	578.
1.01	2.25	29	.01	.00	.01	7.	1.01	14.55	179	.30	.30	.00	578.
1.01	2.30	30	.01	.00	.01	7.	1.01	15.00	180	.30	.30	.00	578.
1.01	2.35	31	.01	.00	.01	8.	1.01	15.05	181	.18	.18	.00	530.
1.01	2.40	32	.01	.00	.01	8.	1.01	15.10	182	.36	.36	.00	514.
1.01	2.45	33	.01	.00	.01	8.	1.01	15.15	183	.36	.36	.00	598.
1.01	2.50	34	.01	.00	.01	9.	1.01	15.20	184	.55	.55	.00	727.
1.01	2.55	35	.01	.01	.01	9.	1.01	15.25	185	.64	.64	.00	928.
1.01	3.00	36	.01	.01	.01	9.	1.01	15.30	186	1.55	1.55	.01	1429.
1.01	3.05	37	.01	.01	.01	10.	1.01	15.35	187	2.55	2.55	.01	2571.
1.01	3.10	38	.01	.01	.01	10.	1.01	15.40	188	1.00	1.00	.00	3203.
1.01	3.15	39	.01	.01	.01	10.	1.01	15.45	189	.64	.64	.00	2564.
1.01	3.20	40	.01	.01	.01	11.	1.01	15.50	190	.55	.55	.00	1812.
1.01	3.25	41	.01	.01	.01	11.	1.01	15.55	191	.36	.36	.00	1324.
1.01	3.30	42	.01	.01	.01	11.	1.01	16.00	192	.36	.36	.00	996.
1.01	3.35	43	.01	.01	.01	12.	1.01	16.05	193	.28	.28	.00	797.
1.01	3.40	44	.01	.01	.01	12.	1.01	16.10	194	.28	.28	.00	663.
1.01	3.45	45	.01	.01	.01	12.	1.01	16.15	195	.28	.28	.00	591.
1.01	3.50	46	.01	.01	.01	12.	1.01	16.20	196	.28	.28	.00	860.
1.01	3.55	47	.01	.01	.01	13.	1.01	16.25	197	.28	.28	.00	848.
1.01	4.00	48	.01	.01	.01	13.	1.01	16.30	198	.28	.28	.00	544.
1.01	4.05	49	.01	.01	.01	13.	1.01	16.35	199	.28	.28	.00	542.
1.01	4.10	50	.01	.01	.01	13.	1.01	16.40	200	.28	.28	.00	541.
1.01	4.15	51	.01	.01	.01	14.	1.01	16.45	201	.28	.28	.00	541.
1.01	4.20	52	.01	.01	.01	14.	1.01	16.50	202	.28	.28	.00	541.
1.01	4.25	53	.01	.01	.01	14.	1.01	16.55	203	.28	.28	.00	541.
1.01	4.30	54	.01	.01	.01	14.	1.01	17.00	204	.28	.28	.00	541.
1.01	4.35	55	.01	.01	.01	15.	1.01	17.05	205	.22	.22	.00	819.

1.01	4.40	56	.01	.01	.01	156	1.01	17.10	206	.02	.02	.00	474.
1.01	4.45	57	.01	.01	.01	156	1.01	17.15	207	.02	.02	.00	466.
1.01	4.50	58	.01	.01	.01	154	1.01	17.20	208	.02	.02	.00	454.
1.01	4.55	59	.01	.01	.01	153	1.01	17.25	209	.02	.02	.00	429.
1.01	5.00	60	.01	.01	.01	15.	1.01	17.30	210	.02	.02	.00	427.
1.01	5.05	61	.01	.01	.01	154	1.01	17.35	211	.02	.02	.00	426.
1.01	5.10	62	.01	.01	.01	164	1.01	17.40	212	.02	.02	.00	485.
1.01	5.15	63	.01	.01	.00	14.	1.01	17.45	213	.02	.02	.00	485.
1.01	5.20	64	.01	.01	.00	16.	1.01	17.50	214	.02	.02	.00	421.
1.01	5.25	65	.01	.01	.00	16.	1.01	17.55	215	.02	.02	.00	425.
1.01	5.30	66	.01	.01	.00	16.	1.01	18.00	216	.02	.02	.00	425.
1.01	5.35	67	.01	.01	.00	17.	1.01	18.05	217	.02	.02	.00	350.
1.01	5.40	68	.01	.01	.00	17.	1.01	18.10	218	.02	.02	.00	200.
1.01	5.45	69	.01	.01	.00	17.	1.01	18.15	219	.02	.02	.00	106.
1.01	5.50	70	.01	.01	.01	17.	1.01	18.20	220	.02	.02	.00	60.
1.01	5.55	71	.01	.01	.00	17.	1.01	18.25	221	.02	.02	.00	51.
1.01	6.00	72	.01	.01	.00	17.	1.01	18.30	222	.02	.02	.00	44.
1.01	6.05	73	.07	.05	.02	31.	1.01	18.35	223	.02	.02	.00	41.
1.01	6.10	74	.07	.05	.02	60.	1.01	18.40	224	.02	.02	.00	39.
1.01	6.15	75	.07	.05	.02	79.	1.01	18.45	225	.02	.02	.00	39.
1.01	6.20	76	.07	.05	.02	88.	1.01	18.50	226	.02	.02	.00	39.
1.01	6.25	77	.07	.05	.02	93.	1.01	18.55	227	.02	.02	.00	39.
1.01	6.30	78	.07	.05	.01	97.	1.01	19.00	228	.02	.02	.00	39.
1.01	6.35	79	.07	.05	.01	99.	1.01	19.05	229	.02	.02	.00	39.
1.01	6.40	80	.07	.05	.01	101.	1.01	19.10	230	.02	.02	.00	39.
1.01	6.45	81	.07	.05	.01	103.	1.01	19.15	231	.02	.02	.00	39.
1.01	6.50	82	.07	.05	.01	105.	1.01	19.20	232	.02	.02	.00	39.
1.01	6.55	83	.07	.06	.01	106.	1.01	19.25	233	.02	.02	.00	39.
1.01	7.00	84	.07	.06	.01	107.	1.01	19.30	234	.02	.02	.00	39.
1.01	7.05	85	.07	.06	.01	108.	1.01	19.35	235	.02	.02	.00	39.
1.01	7.10	86	.07	.06	.01	110.	1.01	19.40	236	.02	.02	.00	39.
1.01	7.15	87	.07	.06	.01	113.	1.01	19.45	237	.02	.02	.00	39.
1.01	7.20	88	.07	.06	.01	111.	1.01	19.50	238	.02	.02	.00	39.
1.01	7.25	89	.07	.06	.01	112.	1.01	19.55	239	.02	.02	.00	39.
1.01	7.30	90	.07	.06	.01	113.	1.01	20.00	240	.02	.02	.00	39.
1.01	7.35	91	.07	.06	.01	114.	1.01	20.05	241	.02	.02	.00	39.
1.01	7.40	92	.07	.06	.01	114.	1.01	20.10	242	.02	.02	.00	39.
1.01	7.45	93	.07	.06	.01	115.	1.01	20.15	243	.02	.02	.00	39.
1.01	7.50	94	.07	.06	.01	116.	1.01	20.20	244	.02	.02	.00	39.
1.01	7.55	95	.07	.06	.01	116.	1.01	20.25	245	.02	.02	.00	39.
1.01	8.00	96	.07	.06	.01	117.	1.01	20.30	246	.02	.02	.00	39.
1.01	8.05	97	.07	.06	.01	117.	1.01	20.35	247	.02	.02	.00	39.
1.01	8.10	98	.07	.06	.01	118.	1.01	20.40	248	.02	.02	.00	39.
1.01	8.15	99	.07	.06	.01	118.	1.01	20.45	249	.02	.02	.00	39.
1.01	8.20	100	.07	.06	.01	119.	1.01	20.50	250	.02	.02	.00	39.
1.01	8.25	101	.07	.06	.00	119.	1.01	20.55	251	.02	.02	.00	39.
1.01	8.30	102	.07	.06	.00	119.	1.01	21.00	252	.02	.02	.00	39.
1.01	8.35	103	.07	.06	.00	120.	1.01	21.05	253	.02	.02	.00	39.
1.01	8.40	104	.07	.06	.00	120.	1.01	21.10	254	.02	.02	.00	39.
1.01	8.45	105	.07	.06	.00	120.	1.01	21.15	255	.02	.02	.00	39.
1.01	8.50	106	.07	.06	.00	121.	1.01	21.20	256	.02	.02	.00	39.
1.01	8.55	107	.07	.06	.00	121.	1.01	21.25	257	.02	.02	.00	39.
1.01	9.00	108	.07	.06	.00	121.	1.01	21.30	258	.02	.02	.00	39.
1.01	9.05	109	.07	.06	.00	121.	1.01	21.35	259	.02	.02	.00	39.
1.01	9.10	110	.07	.06	.00	122.	1.01	21.40	260	.02	.02	.00	39.
1.01	9.15	111	.07	.06	.00	122.	1.01	21.45	261	.02	.02	.00	39.
1.01	9.20	112	.07	.06	.00	122.	1.01	21.50	262	.02	.02	.00	39.
1.01	9.25	113	.07	.06	.00	122.	1.01	21.55	263	.02	.02	.00	39.
1.01	9.30	114	.07	.06	.00	123.	1.01	22.00	264	.02	.02	.00	39.
1.01	9.35	115	.07	.06	.00	123.	1.01	22.05	265	.02	.02	.00	39.

1.01	9.40	116	.07	.06	.00	123.	1.01	22.10	266	.02	.02	.00	39.
1.01	9.45	117	.07	.06	.00	123.	1.01	22.15	267	.02	.02	.00	39.
1.01	9.50	118	.07	.06	.00	123.	1.01	22.20	268	.02	.02	.00	39.
1.01	9.55	119	.07	.06	.00	123.	1.01	22.25	269	.02	.02	.00	39.
1.01	10.00	120	.07	.06	.00	124.	1.01	22.30	270	.02	.02	.00	39.
1.01	10.05	121	.07	.06	.00	124.	1.01	22.35	271	.02	.02	.00	39.
1.01	10.10	122	.07	.06	.00	124.	1.01	22.40	272	.02	.02	.00	39.
1.01	10.15	123	.07	.06	.00	124.	1.01	22.45	273	.02	.02	.00	39.
1.01	10.20	124	.07	.06	.00	124.	1.01	22.50	274	.02	.02	.00	39.
1.01	10.25	125	.07	.06	.00	124.	1.01	22.55	275	.02	.02	.00	39.
1.01	10.30	126	.07	.06	.00	124.	1.01	23.00	276	.02	.02	.00	39.
1.01	10.35	127	.07	.06	.00	124.	1.01	23.05	277	.02	.02	.00	39.
1.01	10.40	128	.07	.06	.00	125.	1.01	23.10	278	.02	.02	.00	39.
1.01	10.45	129	.07	.06	.00	125.	1.01	23.15	279	.02	.02	.00	39.
1.01	10.50	130	.07	.06	.00	125.	1.01	23.20	280	.02	.02	.00	39.
1.01	10.55	131	.07	.06	.00	125.	1.01	23.25	281	.02	.02	.00	39.
1.01	11.00	132	.07	.06	.00	125.	1.01	23.30	282	.02	.02	.00	39.
1.01	11.05	133	.07	.06	.00	125.	1.01	23.35	283	.02	.02	.00	39.
1.01	11.10	134	.07	.06	.00	125.	1.01	23.40	284	.02	.02	.00	39.
1.01	11.15	135	.07	.06	.00	125.	1.01	23.45	285	.02	.02	.00	39.
1.01	11.20	136	.07	.06	.00	125.	1.01	23.50	286	.02	.02	.00	39.
1.01	11.25	137	.07	.06	.00	125.	1.01	23.55	287	.02	.02	.00	39.
1.01	11.30	138	.07	.06	.00	126.	1.02	0.00	288	.02	.02	.00	39.
1.01	11.35	139	.07	.06	.00	126.	1.02	.05	289	0.00	0.00	0.00	31.
1.01	11.40	140	.07	.06	.00	126.	1.02	.10	290	0.00	0.00	0.00	16.
1.01	11.45	141	.07	.07	.00	126.	1.02	.15	291	0.00	0.00	0.00	7.
1.01	11.50	142	.07	.07	.00	126.	1.02	.20	292	0.00	0.00	0.00	3.
1.01	11.55	143	.07	.07	.00	126.	1.02	.25	293	0.00	0.00	0.00	1.
1.01	12.00	144	.07	.07	.00	126.	1.02	.30	294	0.00	0.00	0.00	1.
1.01	12.05	145	.20	.20	.00	175.	1.02	.35	295	0.00	0.00	0.00	0.
1.01	12.10	146	.20	.20	.00	273.	1.02	.40	296	0.00	0.00	0.00	0.
1.01	12.15	147	.20	.20	.00	330.	1.02	.45	297	0.00	0.00	0.00	0.
1.01	12.20	148	.20	.20	.00	360.	1.02	.50	298	0.00	0.00	0.00	0.
1.01	12.25	149	.20	.20	.00	372.	1.02	.55	299	0.00	0.00	0.00	0.
1.01	12.30	150	.20	.20	.00	377.	1.02	1.00	300	0.00	0.00	0.00	0.
									SUM	31.20	30.04	1.16	58153.
										(792.)	(763.)	(29.)	(1646.71)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3203.	937.	202.	194.	58135.
CMS	91.	18.	6.	5.	1646.
INCHES		23.72	30.04	30.04	30.04
MM		602.45	763.11	763.11	763.11
AC-FT		316.	400.	400.	400.
THOUS CU M		390.	494.	494.	494.

HYDROGRAPH AT STA 11004 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	2.
3.	3.	4.	4.	5.	5.	6.	7.	7.	7.
8.	8.	8.	9.	9.	9.	10.	10.	10.	11.
11.	11.	12.	12.	12.	12.	13.	13.	13.	13.
14.	14.	14.	14.	15.	15.	15.	15.	15.	16.
16.	16.	16.	16.	16.	16.	17.	17.	17.	17.
17.	17.	31.	60.	79.	90.	93.	97.	99.	101.
103.	105.	106.	107.	108.	110.	110.	112.	113.	115.
114.	114.	115.	116.	116.	117.	117.	118.	118.	119.

119.	119.	120.	120.	120.	121.	121.	121.	121.	122.
122.	122.	122.	123.	123.	123.	123.	123.	123.	124.
124.	124.	124.	124.	124.	124.	124.	125.	125.	125.
125.	125.	125.	125.	125.	125.	125.	126.	126.	126.
126.	126.	126.	126.	175.	275.	335.	360.	379.	377.
379.	380.	381.	381.	382.	382.	397.	427.	446.	454.
457.	459.	460.	460.	468.	461.	461.	461.	483.	528.
558.	568.	573.	576.	577.	577.	578.	578.	578.	578.
534.	514.	486.	727.	923.	1429.	2571.	3203.	2569.	1812.
1324.	996.	797.	663.	581.	530.	548.	544.	542.	541.
541.	541.	541.	541.	519.	474.	446.	434.	429.	427.
426.	425.	425.	425.	425.	425.	350.	200.	106.	68.
51.	44.	41.	39.	39.	39.	39.	39.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	39.	39.
39.	39.	39.	39.	39.	39.	39.	39.	314.	184.
7.	3.	1.	1.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3293.	637.	202.	194.	58135.
CMS	91.	18.	5.	5.	1646.
INCHES		23.72	30.04	30.04	30.04
MM		602.45	763.11	763.11	763.11
AC-FT		316.	400.	400.	400.
THOUS CU M		390.	494.	494.	494.

HYDROGRAPH AT STA 11004 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	2.	2.	2.	2.	3.	3.	3.	3.	4.
4.	4.	4.	4.	5.	5.	5.	5.	5.	5.
6.	6.	6.	6.	6.	6.	6.	6.	7.	7.
7.	7.	7.	7.	7.	7.	7.	8.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	9.
9.	9.	16.	30.	39.	44.	47.	48.	50.	51.
52.	52.	55.	54.	54.	55.	55.	56.	56.	57.
57.	57.	58.	58.	58.	58.	59.	59.	59.	59.
59.	60.	60.	60.	60.	60.	60.	61.	61.	61.
61.	61.	61.	61.	61.	61.	62.	62.	62.	62.
62.	62.	62.	62.	62.	62.	62.	62.	62.	62.
62.	62.	63.	63.	63.	63.	63.	63.	63.	63.
63.	63.	63.	63.	88.	136.	167.	180.	196.	188.
196.	198.	190.	191.	191.	191.	198.	213.	223.	227.
229.	229.	230.	230.	230.	230.	230.	230.	242.	264.
278.	284.	287.	288.	288.	289.	289.	289.	289.	289.
267.	257.	298.	363.	461.	715.	1285.	1602.	1284.	906.
662.	498.	399.	332.	295.	280.	274.	272.	271.	271.
271.	271.	271.	271.	259.	237.	223.	217.	214.	213.
213.	213.	213.	213.	213.	213.	175.	100.	53.	34.
25.	22.	20.	20.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.

19.	19.	19.	19.	19.	19.	19.	19.	16.	8.
3.	1.	1.	0.	0.	0.	0.	0.	3.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1602.	319.	101.	97.	29967.
CMS	45.	9.	3.	3.	823.
INCHES		11.86	15.02	15.02	15.02
MM		301.22	381.56	381.56	381.56
AC-FT		158.	200.	200.	200.
THOUS CU M		195.	247.	247.	247.

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH LAKEVIEW ESTATES DAM

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30017	1	0	0	2	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-851.	-1

STAGE	851.00	851.61	852.42	852.82	853.00	853.09	853.75	854.50	855.25	856.00
FLOW	0.00	13.00	101.00	172.00	190.00	278.00	1474.00	3710.00	6550.00	9807.00
CAPACITY=	0.	190.	202.	223.	449.	2749.				
ELEVATION=	828.	851.	851.	853.	860.	880.				

CREL	SPWID	COGW	EXPW	ELEVL	COOL	CAREA	EXPL
851.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMID
853.0	0.0	0.0	0.

STATION 30017, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW									
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
3.	3.	4.	5.	5.	6.	7.	8.	8.	9.
9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
20.	21.	23.	25.	27.	29.	32.	36.	39.	42.

SUMMARY OF PMF AND ONE-HALF PMF FLOOD ROUTING

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	 RATIO 2 .50
HYDROGRAPH AT	11004	.26 (.65)	1	3203. (90.71)(	1602. (45.36)(
ROUTED TO	30017	.25 (.65)	1	2370. (67.11)(	1071. (30.32)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	851.00	851.00	853.00
STORAGE	192.	192.	228.
OUTFLOW	0.	0.	190.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	853.05	1.05	257.	2370.	5.92	15.75	0.00
.50	853.53	.53	240.	1071.	4.00	15.83	0.00

PERCENT OF PMF FLOOD ROUTING
EQUAL TO SPILLWAY CAPACITY

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FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79

RUN  DATE= 79/06/14.
     TIME= 10.08.09.
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DAM SAFETY INSPECTION - MISSOURI
LAKEVIEW ESTATES DAM (11004)
PERCENT OF PMF DETERMINATION AND ROUTING

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	0	5	0	0	0	0	0	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS=	.15	.16	.17	.18	.19	.20	.21	.22	.23

SUB-AREA RUNOFF COMPUTATION

INPUT INDEX PRECIPITATION AND RATIOS, INPUT SCS UNIT HYDROGRAPH PARAMETERS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
11004	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.25	0.00	.25	1.00	0.300	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	24.00	100.00	120.00	130.00	0.00	0.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-91.00	0.00	0.00

CURVE NO = -91.00 WETNESS = -1.00 EFFECT CN = 91.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= .12

RECESSION DATA
STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM 31.28 30.86 1.16 58153.
(792.)(763.)(29.)(1646.71)

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HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH LAKEVIEW ESTATES DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
33017	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.03	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-851.	-1

STAGE	851.00	851.61	852.42	852.92	853.00	853.09	853.75	854.50	855.25	856.00
FLOW	0.00	13.00	101.00	173.00	190.00	278.00	1474.00	3710.00	6550.00	9907.00
CAPACITY=	0.	192.	202.	223.	449.	2749.				
ELEVATION=	828.	851.	851.	853.	860.	880.				

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
851.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COGD	EXPD	DAMWID
853.0	0.0	0.0	0.

PEAK OUTFLOW IS 159. AT TIME 16.00 HOURS

PEAK OUTFLOW IS 173. AT TIME 16.00 HOURS

PEAK OUTFLOW IS 182. AT TIME 16.00 HOURS

PEAK OUTFLOW IS 193. AT TIME 16.00 HOURS

PEAK OUTFLOW IS 223. AT TIME 15.92 HOURS

PEAK OUTFLOW IS 250. AT TIME 15.92 HOURS

PEAK OUTFLOW IS 271. AT TIME 15.92 HOURS

PEAK OUTFLOW IS 316. AT TIME 15.92 HOURS

PEAK OUTFLOW IS 384. AT TIME 19.92 HOURS

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS								
				RATIO 1 .15	RATIO 2 .16	RATIO 3 .17	RATIO 4 .18	RATIO 5 .19	RATIO 6 .20	RATIO 7 .21	RATIO 8 .22	RATIO 9 .23
HYDROGRAPH AT	11004	.25	1	481.	513.	545.	577.	609.	641.	673.	705.	737.
		(.65)		(13.61)	(14.51)	(15.42)	(16.33)	(17.24)	(18.14)	(19.05)	(19.96)	(20.86)
ROUTED T	30017	.25	1	159.	173.	182.	193.	223.	250.	277.	316.	350.
		(.65)		(4.49)	(4.91)	(5.15)	(5.47)	(6.31)	(7.09)	(7.84)	(8.95)	(10.02)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	851.00	851.00	853.00
STORAGE	192.	192.	223.
OUTFLOW	0.	0.	190.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.15	852.74	0.00	220.	159.	0.00	16.00	0.00
.16	852.82	0.00	221.	173.	0.00	15.00	0.00
.17	852.91	0.00	222.	192.	0.00	15.00	0.00
.18	853.00	.00	223.	193.	.08	15.00	0.00
.19	853.03	.03	224.	223.	.42	15.92	0.00
.20	853.06	.06	225.	250.	.50	15.92	0.00
.21	853.09	.09	226.	277.	.67	15.92	0.00
.22	853.11	.11	227.	316.	.75	15.92	0.00
.23	853.13	.13	227.	354.	.75	15.92	0.00


DAT
ILM